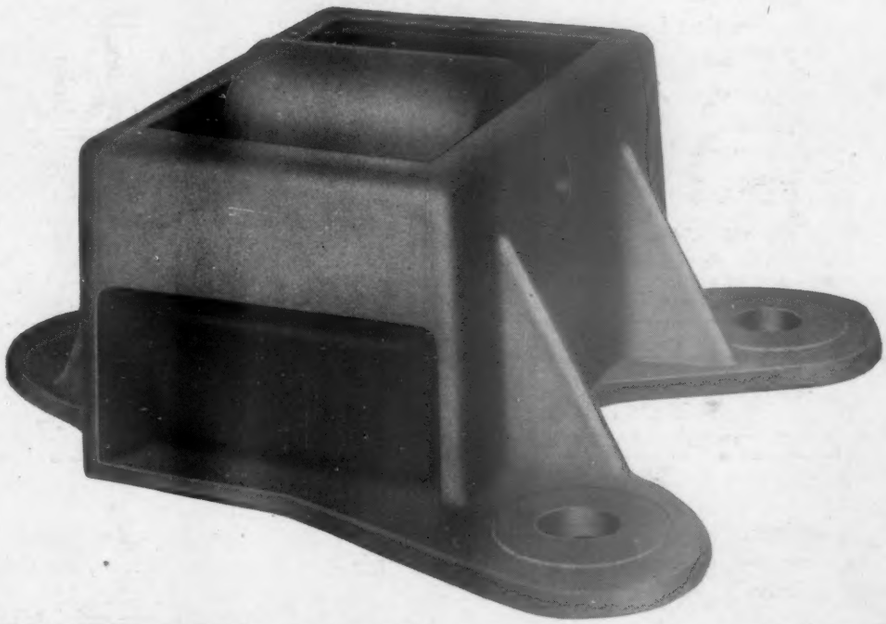
GENERAL LIBRARY
APR 14 1919
UNIV. OF MICH.

Railway Age

FIRST HALF OF 1919—No. 15 NEW YORK—APRIL 11, 1919—CHICAGO SIXTY-FOURTH YEAR

Published weekly by Simmons-Boardman Pub. Co., Woolworth Bldg., New York, N. Y. Subscription Price, U. S. and Mexico, $5.00 a year; Canada, $6.00; foreign countries (excepting daily editions), $8.00. Entered as second-class matter, January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

WINE SIDE BEARINGS



TRAVEL. The "WINE" Side Bearing has a rolling travel of 6 inches which is sufficient for all main line curves.

CLEARANCES. The "WINE" Side Bearing can be adjusted to close clearances on account of the roller maintaining the same height in all positions.

MATERIAL. All wearing parts in the "WINE" Side Bearing are made from high carbon steel, which insures the bearing a long life.

APPLICATION. The "WINE" Side Bearings can be applied to old as well as new cars. We have a great many designs in stock and are equipped to handle any order, either large or small, promptly.

TRUCK SIDE BEARINGS were applied to 70% of the 100,000 cars ordered by the United States Railroad Administration.

THE WINE RAILWAY APPLIANCE COMPANY

People's Gas Bldg. Chicago, Ill. — TOLEDO, OHIO — Miner's Bank Bldg. Wilkes-Barre, Pa.

Manufactured and sold in Canada by the
CANUCK SUPPLY CO., Ltd.
Montreal Toronto Winnipeg Vancouver

Alphabetical Index to Advertisements, Page 5. Classified Directory of Advertisers, Page 6.

CHASE Leatherwove

The long wearing, rich-appearing upholstery material—inexpensive and distinctive.

L. C. CHASE & CO., Boston
NEW YORK DETROIT CHICAGO
SAN FRANCISCO

The standard upholstery for over a third of a century—grades for all uses.

CHASE
Goat Brand
Car Plush

Chicago-Cleveland Car Roofing Company
MANUFACTURERS OF STEEL ROOFS AND CARLINES FOR FREIGHT CARS
535 RAILWAY EXCHANGE BUILDING Michigan and Jackson Boulevards CHICAGO

GOLD'S VAPOR SYSTEM
WITH No. 1112 VAPOR VALVE
For Application Inside of Car.

POSITIVELY WILL NOT FREEZE.
ABSOLUTELY FOOL-PROOF.
NO ADJUSTMENT WHATEVER REQUIRED.
ECONOMICAL IN STEAM.
SMALL AND LIGHT IN WEIGHT
ALL PARTS ACCESSIBLE
CHEAPER TO INSTALL AND MAINTAIN.

WRITE FOR CIRCULAR.
GOLD CAR HEATING & LIGHTING CO.
17 BATTERY PL. (Whitehall Bldg.) NEW YORK
Manufacturers of Complete Car Heating and Ventilating Apparatus

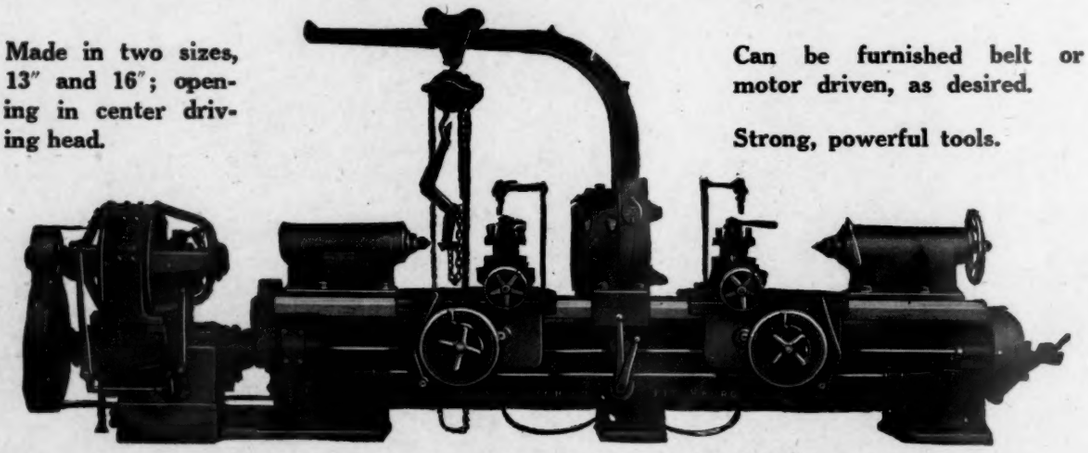
AIR REDUCTION COMPANY, INC.
HOME OFFICE 120 BROADWAY N.Y.C
WELDING AND CUTTING APPARATUS
CALCIUM CARBIDE
OXYGEN
NITROGEN
AIRCO
ACETYLENE GENERATORS
ACETYLENE
WELDING RODS

Putnam Heavy Double Axle Lathes

Made in two sizes, 13" and 16"; opening in center driving head.

Can be furnished belt or motor driven, as desired.

Strong, powerful tools.



MANNING, MAXWELL & MOORE, Inc.
119 WEST 40TH STREET, NEW YORK
Machine Shop and Foundry Equipment of Every Description

BRANCH OFFICES
Boston Chicago Cleveland Mexico Cit, Mexico New Haven Pittsburgh
Buffalo Cincinnati Detroit Milwaukee Philadelphia St. Louis
San Francisco Yokohama, Japan

3

EDITORIAL

Railway Age

The Service Idea and Railroading

The idea that a sale completes a business transaction is out tune with modern business methods. Nowadays it is almost universally accepted as a fact that the sale is only the beginning and that it must be backed up by service. Generally speaking a railroad has nothing to sell but transportation, freight and passenger. That the organizations built up by the railroads under private control for the sale of freight transportation were founded on the service idea was amply demonstrated to shippers. They, however, constitute but a small proportion of those who come in direct contact with the railroads when the general traveling public is considered. Unfortunately the "service" idea has not been so clearly demonstrated to the traveler. Unless seriously inconvenienced by a lapse in the service, the traveler is apt to take everything for granted. It is the lapses, however, that stick in his mind, and as it is not practical to force on his attention all that is being done to insure him a pleasant trip, a special effort should be made to reduce these lapses to a minimum. There are many means which suggest themselves to accomplish the desired end. One of the most obvious is to place responsible representatives of the railroad in the traveler's shoes, so to speak. Their duties would be to travel, making use of the various conveniences set up for aid to the traveler, putting questions to trainmen, to the attendants at information bureaus and to other employees having duties of informational character. If the service rendered is satisfactory, well and good. If not, the remedy will suggest itself. There is no doubt that such measures will more than pay for the trouble.

Stabilizing Industrial Conditions

The article on "Railroad Purchases as a Stabilizer of Business," by F. B. Ernst, on another page, is of more than ordinary interest because it amplifies and supplements the address on this subject which was made by Dr. W. F. M. Goss at the March meeting of the New York Railroad Club (*Railway Age,* March 28, 1919, page 854). While railway supply manufacturers are, of course, the greatest sufferers from the "feast and famine" conditions in that industry, the railroads, the industries generally and the public as a whole are also affected. The problem is so great and such a large percentage of the population of the country is affected that it should be given the most serious consideration. E. H. Harriman, when he was alive, did much to stabilize conditions by buying heavily of the equipment manufacturers when business was light; while he was probably actuated largely by the fact that prices were at their lowest point, he not only did a service to his own properties but gave a real impetus to an increase of business in other lines of industry. As Dr. Goss pointed out, the depreciation of equipment goes on at a fairly regular rate, and this is also true of the growth of the country and the increased demands upon the railroads. These factors enter so largely into the demands for equipment that it would seem that they must have a most important bearing upon the final solution of the problem. E. B. Leigh, president of the Chicago Railway Equipment Company, has for a long time insisted that general industrial prosperity was dependent upon and followed closely on periods of heavy buying of equipment on the part of the railroads. His reasons for this belief are given clearly in the article entitled "Railway Buying and Industrial Readjustment" which was published in the *Railway Age* of April 4. While the Railroad Administration, under the present conditions, is more or less handicapped in the ordering of equipment, it would seem that it might properly give critical consideration to the relation of railway purchases to general prosperity and that it might prepare plans to develop a greater regularity in the purchasing of equipment and be in a position to make recommendations in this respect to the American Railroad Association when the railroads are turned over to the private managements at the end of government control.

The British Transport Bill

The Transport Bill, providing for the establishment of a Ministry of Ways and Communications in control of practically all means of transportation in the United Kingdom and Ireland passed its second reading in the House of Commons on March 18, although it was only introduced by the government on February 27, not three full weeks earlier. This does not mean that it has progressed so rapidly for lack of strong opposition—a fact which makes all the more striking the contrast between the rapidity with which this bill is moving to its passage and the slowness with which the plans for the disposition of the railroads have matured in our own country. The British Ministry of Ways and Communications bill is all-inclusive from the standpoint of transportation. From the abstract of the bill in the *Railway Age* of March 21, page 787, it will be seen that it puts under the control of the ministry which it is proposed to establish, not only railroads, but light railways, canals, waterways and inland navigations; roads, bridges and ferries, and vehicles and traffic thereon; harbors, docks and piers; and the supply of electricity; (a provision to include tramways also was dropped before the second reading). As has been mentioned in the *Railway Age,* there has been much opposition to the bill, particularly on the part of the road transportation and dock interests, who object to having these facilities put under the control of the railway man or, at any rate, of a man who will look at their problems from the railroad point of view. These objections, however, as strongly as they were presented in the House of Commons on March 17 and 18 following the explanation of the necessity for the bill by Sir Eric Geddes and his motion for its second reading, were not sufficient to impede the progress of the bill. It is interesting, however, to observe that but little opposition has been evinced by the railroad interests. The railroad situation in Great Britain is exceedingly serious—Sir Eric Geddes pointed out that at present the railroads are suffering a deficit of £100,000,000 a year and that the transportation services "are financially in a semi-paralyzed state." The government is pledged for two years more to pay the guarantee of earnings on the basis of 1913. The term of the bill is for two years and, therefore, merely takes up, as it were, this guarantee. There was serious opposition manifested to a provision of the bill which provided in brief that the minister might "purchase the whole or any part of a railway," by authority

of an order in council which should lie before the Parliament for not less than 30 days, etc., which it was feared might lead to nationalization without sufficient opportunity for consideration, but this was amended before the second reading. But enough has been said to show that the bill is of epoch making character and deserves careful consideration on the part of American students of the railway problem.

Liquidation of War Contracts

A VALUABLE AND IMPORTANT SERVICE for the business interests of the country is being performed by the Federal Liquidating Association, recently formed to facilitate and hasten the liquidation of reduced, suspended, terminated or cancelled war contracts, formal and informal, many of which are held by companies primarily engaged in the railway supply field. Thousands of contracts were suspended by the government following the signing of the armistice in the midst of performance, and as a result billions of dollars, a substantial part of the currency of national commerce, is frozen in the treasury pending liquidation of these agreements, under circumstances such that there is little precedent to guide. The Association of Manufacturers of War Materials, whose officers constitute the directing personnel of the new association, was largely instrumental in procuring the enactment of a satisfactory bill validating informal war contracts and in obtaining a modification of the rulings of the war department affecting settlements with sub-contractors. Now that a plan of settlement has thus been afforded, experience has demonstrated the necessity for a co-operative agency for presenting the case of the contractors in respect of the whole matter of liquidation.

The tedious process of litigation must be avoided and settlement must be made just as the contracts were made, by newly negotiated settlements and agreements fair to the government and to the contractor. This negotiation cannot proceed with the freedom of private business. Government departments are necessarily restricted by statutory and regulatory limitations which are intricate and involved. Official action on each separate negotiation must be had in Washington by responsible officers with full authority. Yet the field is so vast that the government has been forced to set up a complicated mechanism radiating from the capital, so that each case must be followed through from the field to Washington. Moreover, the settlement of so vast a number of suddenly terminated contracts presents a new problem, each contract presenting an infinite variety of terms and conditions. To meet this situation, the Federal Liquidating Association has been formed by a process of reorganization to meet the new conditions of the former co-operative Association of Manufacturers, with a view to obtaining the same kind of centralized organization with a decentralized auxiliary organization as has been formed by the government.

While the installation of an adequate organization entailed a considerable sacrifice, the officers of the association were persuaded to undertake it as a public service of such difficulty and magnitude that its successful accomplishment must challenge general attention. Every effort has been made to secure the services of the best men for the work and to create an organization which will make their services available to all contractors. Brig. Gen. Hugh S. Johnson is president of the association, and the personnel throughout has been carefully selected for its familiarity through service in governmental bureaus with department methods and with war contracts. W. S. Symington, Jr., general counsel for the Symington interests, and C. J. Symington, president of the Symington Machine Corporation, also share in the direction of its affairs. The secretary is H. H. Dinneen, who was secretary of the Association of Manufacturers of War Materials. The Washington headquarters will keep in close touch with the various governmental departments, presenting the contractors' point of view generally and attending to the expedition and presentation of all matters pending before any departmental agency. Local officers have also been established in the principal large cities convenient to the local boards of adjustment.

The war department has this week announced that it is now able to adjust and settle all of its war obligations, both formal and informal, and is prepared to do so with the greatest possible speed. It has issued complete instructions regarding the process and basis of effecting settlements and the character and the spirit of the men who are representing the business interests seem to assure the sort of co-operation needed to bring about the speediest possible settlement of this important question.

Train Service Employees' Wage Settlement

DIRECTOR GENERAL HINES this week granted an advance in wages to the four classes of train service employees—engineers, conductors, firemen and other trainmen. It is estimated that the advances granted will average about 9 per cent and that their total cost will be $55,000,000 a year. The same order which grants these advances refers to Adjustment Board No. 1 of the Railroad Administration, which is composed of four officers and four employees, the question as to whether and, if so, under what conditions, overtime at the rate of time and a half shall be granted to road train service employees for work in excess of eight hours a day.

This order raises two very interesting questions. The first is, as to the justifiability of an advance in wages to the train service employees at this time. The second is, as to the wisdom of the action taken in referring the consideration of the question of punitive overtime to a board of officers and employees.

The advance in wages made was expected by those who have been familiar with recent developments in railroad affairs. The Railroad Administration takes the position that it practically closes a cycle of advances in wages under government operation and that it was necessary, in order to place the compensation of the train service employees on a parity with that of other employees.

The question of when the present cycle of advances in wages began is open to discussion. The Adamson law went into effect on January 1, 1917. By establishing the principle of the "basic eight-hour day," it gave the train service employees an advance in wages of about $60,000,000 a year. This, in the opinion of many who closely follow railway developments, was the real beginning of the new wage cycle, and on that theory the cycle really was ended before the advance made to the train service employees this week. As a matter of fact, however, the passage of the Adamson act was followed, under private operation, by advances to many other classes of employees. When government control went into effect on January 1, 1918, there were still pending demands for advances in wages from many classes of railway employees, including those in train service, and advances to practically all classes of employees undoubtedly would have had to be made under private operation. In accordance with the recommendations of the Railway Wage Commission, Director General McAdoo issued order No. 27 which made general advances in the wages of the employees, including an advance of 29 per cent to those in train service.

While this order at first looked like a reasonable one, its application disclosed the fact that it provided for relatively much larger advances to some classes of employees than to

others, and that it substituted many glaring inequalities for the inequalities which had been known to exist before. The advances made to some classes of employees were insufficient to hold an adequate number of them in railway service against the competition from other industries in which much larger advances to similar classes of workers had been made. In consequence, it was immediately found necessary to make a large additional advance to the employees in shops.

From the standpoint of the Railroad Administration, this really opened the latest cycle of railroad wages. It made the wages of the shop employees relatively much higher than those of almost all other classes of employees. In consequence, other classes of employees demanded further advances and they were granted; and it is unquestionably true that, until the advance to the train service employees was made this week, their wages were lower in proportion to those of other classes of employees than they were before government control was adopted. The order issued this week makes their wages approximately 40 per cent higher than they were before government control, and practically re-establishes, except in some extreme cases, the relationship between their wages and those of other employees, which formerly existed. Assuming that the other advances which have been granted are reasonable, it would be difficult to show that this advance to the train service employees is unreasonable.

The reference of the question of punitive overtime to a board of officers and employees promises to result in some developments which will be more interesting and important than these advances in wages. Under the terms of the director general's order, the board is instructed to make a study of and to report upon the practicability and propriety of granting punitive overtime at this time. It is to consider, in connection with this matter, what rules and working conditions should be eliminated or changed in consideration of granting punitive overtime in case it is decided that it should be granted. While the representatives of the employees may attempt to get punitive overtime while retaining the existing rules and working conditions, it is difficult to believe that any rational person, familiar with the facts, can actually believe that it would be reasonable or just both to grant time and a half for overtime and retain some of the most important rules and working conditions now in effect.

For example, in numerous cases, under the existing rules, train service employees may be paid two days' wages for work, all of which is done within eight hours, merely because they rendered in a single working day two classes of service which are held to be different kinds of work. If the employees are to be paid time and a half for any work done in excess of eight hours or any mileage run in excess of 100 miles, there surely can be no good reason why they should, under any circumstances, be paid for more than a day's work when they have not worked more than eight hours or run more than 100 miles. In other words, if they are to be paid time and a half for working more than a day they should not be paid, under purely arbitrary rules, for working more than a day when they actually have not worked more than a day. It is very questionable whether punitive overtime should be paid in train service at all because it is manifestly impossible, without a revolution in railway operation, actually to limit the working day in train service to eight hours; and certainly, unless the employees are willing to make concessions in respect to other matters which will save many millions of dollars, they should not be granted punitive overtime, which would be sure to cost much more than all the savings which could be effected by the abolition of all the arbitrary rules and working conditions.

Punitive overtime is to be granted to train service employees engaged in yard work upon the theory that the working day in yard service actually can be limited to eight hours. Even in yard service, the working day cannot be limited to eight hours without a large increase in railway expenses, and before punitive overtime in road service is granted, if it ever is granted, there should be a very clear understanding as to what it is going to cost and as to what savings are to be effected by the concessions granted by the employees.

The wage advances which have now been granted under government operation run to a very large total. Principally as a result of them there has been an enormous increase in railway expenses, which the public must pay. The Railroad Administration and the public are entitled to expect that in return for the present high wages, employees will do the most efficient work of which they are capable. It is universally conceded that, for many months, the efficiency of railway labor has been not high but low. Reports indicate that this condition is improving. Let us hope that it will continue to improve, for the present situation in respect to railway expenses and earnings is extremely serious and the public, which is paying higher rates than ever before and, in addition, bearing a large deficit which has to be met from taxes, has a right to demand a great increase in the efficiency of operation.

The Need for Another Advance in Rates

AN EARLY and substantial advance in rates must be made if the Railroad Administration is to stop piling up a large deficit. This fact is clearly demonstrated by the statistics of earnings and expenses for the last five months for which they are available, and especially for the months of January and February. The Class I railways earned in February a net operating income of only $10,000,000, whereas the average net operating income earned by them in February, 1915, 1916 and 1917, was $47,000,000. In other words, in February they incurred a deficit for the government of $37,000,000. Their deficit in January was $36,000,000, making a total deficit for the first two months of this year of $73,000,000. The armistice was signed early in November. In the four months immediately following it, the railways should have earned $259,000,000 net operating income in order to have covered the guaranteed standard return to the companies. They actually earned only $114,000,000.

It is useless to try to dodge the plain implication of these figures. During the first four months following the signing of the armistice the railways earned only 44 per cent of the guaranteed standard return to the companies. During the first two months of the year they earned only 30 per cent of the standard return guaranteed to the companies. It is not conceivable that the results throughout the year would continue to be so bad, but it is probable that, if existing rates should be continued, the deficit for the year would be at least $400,000,000. In some respects the conditions have been abnormally unfavorable. For example, traffic has been declining very greatly. On the other hand, some of the most important conditions were abnormally favorable. Never in the history of railroad operation in America were there four winter months when the conditions were more conducive to economical operation than they were in the four months under review.

The statistics reflect a situation which it is hardly an exaggeration to describe as appalling. The standard returns guaranteed to the companies are based upon the average net operating income earned in the three years ending on June 30, 1917. Therefore, to say that the railways are earning only about one-third of their guaranteed standard returns is equivalent to saying that they are earning only one-third as much net operating income as they earned in those

three years. Nothing is to be gained and everything is to be lost by not squarely facing the facts. The facts are that the government as a railroad manager is bankrupt, and that if the railways should now be returned to private operation, many of the companies would be bankrupted.

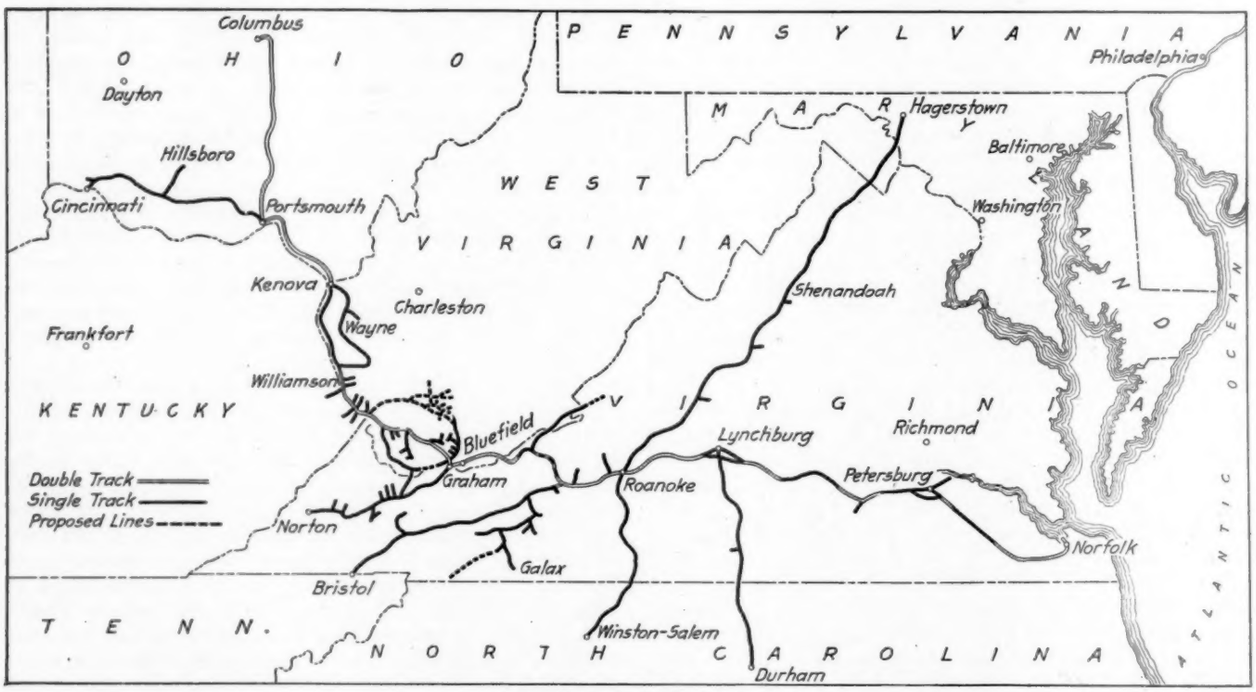
There is only one remedy for this situation, and in the interest of the national welfare it must be applied and applied promptly. The margin between earnings and operating expenses must be greatly increased. This can be done by reducing operating expenses or by advancing rates, or by both. We believe that even on the basis of present wages operating expenses can be reduced, but we do not believe they can be substantially reduced under government operation. In the first place, the system of centralized management adopted by Mr. McAdoo was fundamentally wrong. Really good operating results will never be obtained until it is abandoned. It is impossible under this system to create the needed competition and emulation between the officers of individual lines and to re-establish the needed discipline among employees. In the second place, the very fact that the roads are in the hands of the government militates against efficiency. Theorists may denounce with all their might the operation of the railways for private profit, but the desire and opportunity to make profits constitute the greatest incentive to efficiency known, and until that incentive is restored the greatest operating efficiency will not be restored.

In view of the results of operation within recent months, however, it is perfectly evident, as the *Railway Age* has said before, that with present wages and present rates the railways cannot be made under either government or private operation to earn an adequate net operating income. If the government continues to operate them it will, unless rates are advanced, continue to incur a large deficit. Unless rates are advanced many of the companies, if the railways should be returned to private operation, would be ruined.

The Railroad Administration should not continue to impose additional burdens upon the taxpayers by continuing to operate the railways at a heavy loss. Already the deficit which it has incurred, and which the taxpayers must pay, exceeds $300,000,000. The shippers and travelers of the country should be made to bear the expense of operating the railroads. The burdens under which the taxpayers are staggering are heavy enough. The rates should immediately be advanced at least 10 per cent, and as soon as practicable legislation should be enacted under which the railways can and will be restored to private operation. Furthermore, now that the advance in wages to the train service employees has been made, advances in wages to large classes of railway employees should be stopped. There doubtless will remain some readjustments in the salaries of the lower ranks of railway officers which should yet be made, but with the railroads in the condition they are now the public has a right to insist that no more advances to large classes of employees involving increases in expenses of many millions a year shall be made until a very different relationship from that now existing has been established between railway earnings and expenses.

Norfolk & Western

THERE IS NO RELATION between the income account of a railroad corporation in 1918, the property of which is being operated by the government, and the earnings and expenses of the property. The income account of the corporation is a simple statement of the rental due from the government, other income, cost of maintenance of the corporate organization, interest charges, dividends, etc. From this the security holder can get no inkling of what the property itself is doing under government management. For instance, the Norfolk & Western in 1918 receives (only part payment has so far been made) $20,634,000 rental from the government and, after having paid $1,716,000 war taxes and taken into its account other income such as dividends and interest on security owned, has $19,918,000 gross income. From this it paid its interest charges, leaving $15,805,000 available for dividends. This compares with $18,946,000 available for dividends in 1917, when the corporation was itself operating the property.



The Norfolk & Western

What investors and Norfolk & Western officers and other railroad officers want to know is the revenues and expenses resulting from the actual operation of the property itself. President L. E. Johnson sums up the point in his annual report to stockholders for 1918. He says: "The agreement stipulates that the director general shall, during federal control, furnish the company copies of the operating reports relating to its property. The results of these operations do not directly concern your company and do not affect its annual compensation, but they are interesting and important for the series of yearly comparisons and will, therefore, be set out in this report and in the accompanying tables."

The actual operation of the property came pretty near furnishing enough net operating income to meet the government's rental requirements. Total operating revenues—we are now talking about the property itself, not the corporation—amounted to $82,004,000, an increase of $16,095,000 or 24.42 per cent over 1917. Operating expenses amounted to $61,579,000, an increase of $20,418,000 or 49.60 per cent over 1917. Net revenue amounted to $20,425,000; this compares with $20,634,000, the rental which the government pays, but from the net revenue must also be subtracted all taxes other than war taxes. No estimate is made of what these will amount to, but the Norfolk & Western's taxes in 1916, before war taxes were assessed, amounted to $2,480,000. Thus the property has failed by only about two to three million dollars to earn its rental, and this notwithstanding the fact that money was spent freely for both maintenance of way and maintenance of equipment in 1918. There was apparently a quite generous co-operation between the Railroad Administration and the Norfolk & Western corporation in doing everything possible to provide railroad facilities to move the business offered and, above all, to move coal. Evidences of the government's part are to be found in the large amounts spent for maintenance, and the company, from its corporate funds, spent large sums for additions and betterments, chargeable to capital account.

The company spent $5,585,000 in 1918 for additions and betterments to roadway and structures. Of this amount, $1,030,000 was for sidings and spur tracks and $1,217,000 for terminal yards. Further extensions of the electrical operation of the road were held up, but $646,000 was spent on capital account for additions to the electric power transmission plants. There was $333,000 spent for additions and betterments to shops, enginehouses and turntables. Besides the amount spent for additions to road, there was $8,271,000 spent for additions to equipment, the net charge to capital account for equipment being $7,930,000 after making a credit of $341,000 for equipment retired. These are large capital expenditures, especially in view of the fact that the Norfolk & Western had, just prior to 1918, completed a 15-year program of additions and betterments to the property. As President Johnson points out, however, "While your company has at all times aimed to protect the interests of its security holders, the great emergencies created by the declaration of war with Germany in the spring of 1917 have made co-operation with the federal government its paramount duty." In all, the corporation has approved of the expenditure for additions and betterments of about $27,000,000, of which, as noted above, $13,515,000 was charged to property account in 1918. The annual rental is figured without the full interest on capital expenditures made in 1918, and the 1919 rental, therefore, will not only include interest on this amount for one year and on the additional amount spent in 1919, but will also include a certain amount of the 1918 interest not as yet determined upon.

The personnel of the Norfolk & Western was little disturbed by the change to government operation, except that N. D. Maher, president of the road in 1917, resigned in June, 1918, to accept the regional directorship of the newly created Pocahontas Region. A. C. Needles, who had been vice-president in charge of operation, was appointed federal manager. The imperative need for adding in every way possible to the facilities for carrying coal, recognized so fully by the corporation, led the Railroad Administration to authorize expenditures for maintenance which were probably limited only by the need for maintenance work and by the availability of men and materials.

The total maintenance of way expenses in 1918 amounted to $9,525,000, an increase of $3,348,000 over 1917, or 54.21 per cent. There was $1,370,000 spent for ties, an increase of 97.80 per cent over 1917. Roadway maintenance cost $1,455,000, an increase of 102.77 per cent. Track laying and surfacing cost $2,011,000, an increase of 68.55 per cent. The Norfolk & Western has been one of the roads which, following the permission and suggestion of the Interstate Commerce Commission, has in recent years been charging depreciation on structures. It is particularly interesting, therefore, to note that the Railroad Administration has continued this practice and has, apparently, approved of the rate of depreciation determined upon by the company, since under the administration the charges for depreciation are fairly close to the charges made by the company, although in the case of station and office buildings, the administration has made a considerably larger appropriation than the company did. The maintenance of way expenses per mile of road averaged $4,563 in 1918 as against $2,960 in 1917. The Norfolk & Western, operating 2,087 miles of road, has 557 miles of second track and 1,410 miles of siding and yard tracks, but even with this large proportion of other than first tracks, the maintenance charges in 1918 appear to be generous.

Maintenance of equipment cost $21,273,000 in 1918, or $9,221,000 more than in 1917. The Norfolk & Western has maintained its equipment in first-class condition, and an increase of 76.51 per cent in maintenance of equipment expenditures seems high. In maintenance of equipment as in maintenance of way, the Railroad Administration apparently accepted the rate of depreciation used by the company as substantially correct and made charges only a little higher in 1918 than in 1917. The repairs, including depreciation and retirements of equipment per unit in 1918 and 1917 were as follows:

	1918	1917
Steam locomotives (freight)	$9,220	$4,681
Electric locomotives (freight)	21,179	16,254
Steam locomotives (passenger)	8,154	4,397
Passenger train cars	1,679	1,006
Freight train cars	198	123

The increase in transportation expenses was large—38.11 per cent. The freight business handled in 1918 was less, measured either in number of tons or ton miles, than in 1917, and the passenger business handled was more only because the average length of passenger journey was longer in 1918 than in 1917, the number of passengers carried being less last year than the year previous. The transportation expenses that stand out as having greatly increased are yard enginehouse expenses which amounted to $434,000 in 1918 or to more than twice as much as in 1917; train enginehouse expenses which amounted to $1,663,000 in 1918, an increase of nearly 90 per cent; and loss and damage to freight which amounted to $420,000, an increase of 76 per cent.

The character of traffic handled did not change greatly except for the falling off in tonnage of lumber and of bituminous coal. Of the total 51,404,000 tons of freight carried in 1918, 58.77 per cent was bituminous coal and 4.46 per cent lumber. In 1917, of the total 53,089,000 tons of freight carried, 60.18 per cent was bituminous coal and 5.62 per cent lumber.

The Norfolk & Western was able to maintain the high

standard of train load and car loading that had been set for it under private management. The train load averaged 1,041 tons in 1918, an increase of nearly 20 tons over the previous year, and the average loading per loaded freight car was 37.37 tons in 1918, an increase of 2.50 tons or 7.17 per cent over 1917. The Norfolk & Western has 1,669 100-ton capacity gondola cars, but even so, an average car load per loaded car of over 37 tons is quite remarkable.

The following table shows the principal items of income and expense for operation of the property under federal management, in 1918 as compared with 1917. It must be remembered that this is not the income account of the corporation:

	1918	1917
Mileage operated	2,087	2,086
Freight revenue	$68,752,260	$56,381,036
Passenger revenue	10,237,600	7,023,153
Total operating revenues	82,004,034	65,910,242
Maintenance of way and structures	9,524,659	6,176,369
Maintenance of equipment	21,273,002	12,051,912
Traffic expenses	536,709	809,723
Transportation expenses	28,739,291	20,808,290
General expenses	1,309,866	1,217,101
Total operating expenses	61,579,297	41,161,503
Net operating income	20,524,737	24,748,739
CORPORATION INCOME ACCOUNT.		
Rental	$20,634,142	$24,062,445*
War Taxes	1,716,000	2,134,440
Gross income	19,918,302	22,998,881
Net income	15,804,526	18,946,137
Dividends	9,357,103	10,552,297
Surplus	6,447,423	8,393,840

*Corresponding income from operation in 1917.

New Books

Test of a Flat Slab Floor, by Arthur N. Talbot and Harrison F. Gonnerman. Bulletin No. 106, Engineering Experiment Station, University of Illinois, Urbana, Ill. Price, 25 cents.

The tests reported in this bulletin have the distinction that they were carried practically to destruction, this being possible because the building in which they were made was about to be removed to make room for the new Chicago Union Passenger Station. Because of this, and the fact that the concrete was afterwards broken away so as to expose the exact position of the reinforcement, it was possible to learn more concerning the action of flat slab floors under heavy loads than in previous tests. The conclusion reached by the authors, tends to confirm the more generally accepted assumptions on flat slab design; and, to use their own words "should give added confidence in the suitability and reliability of flat slabs as a load carrying structure."

Boston & Lowell, Nashua & Lowell, and Salem & Lowell, Railroads. By F. B. C. Bradlee. 64 pages, 6¼ in. by 9¼ in. Illustrated. Bound in cloth. Published by the Essex Institute, Salem, Mass.

This is a well written monograph filled full of interesting data, gossip and local miscellany concerning the railroads named, and with much collateral local matter concerning railroad life in Eastern Massachusetts from 1830 down to the time that these roads were absorbed in the Boston & Maine System. The illustrations consist of portraits of prominent railroad officers of that time and reproductions of timetables, pictures of old locomotives, etc. The Tyler switch, an attachment to stub switches to prevent derailments, was in use as early as 1850. Interlocking, however, was not even thought of. At Lowell, where the Nashua & Lowell joined the Boston & Lowell "a lantern in the night placed on the switch frame shows the switch is wrong. Absence of lantern signifies the switch to be right." Block signaling also, had not been heard of, and the author tells of the practice—name of road not given—of keeping trains apart by a show of fingers. The station agent held up to the engineman as many fingers as would indicate the number of minutes which had elapsed since the passage of the last preceding train.

Letters to the Editor

Standard Freight Car Repairs

PITTSBURGH, PA.

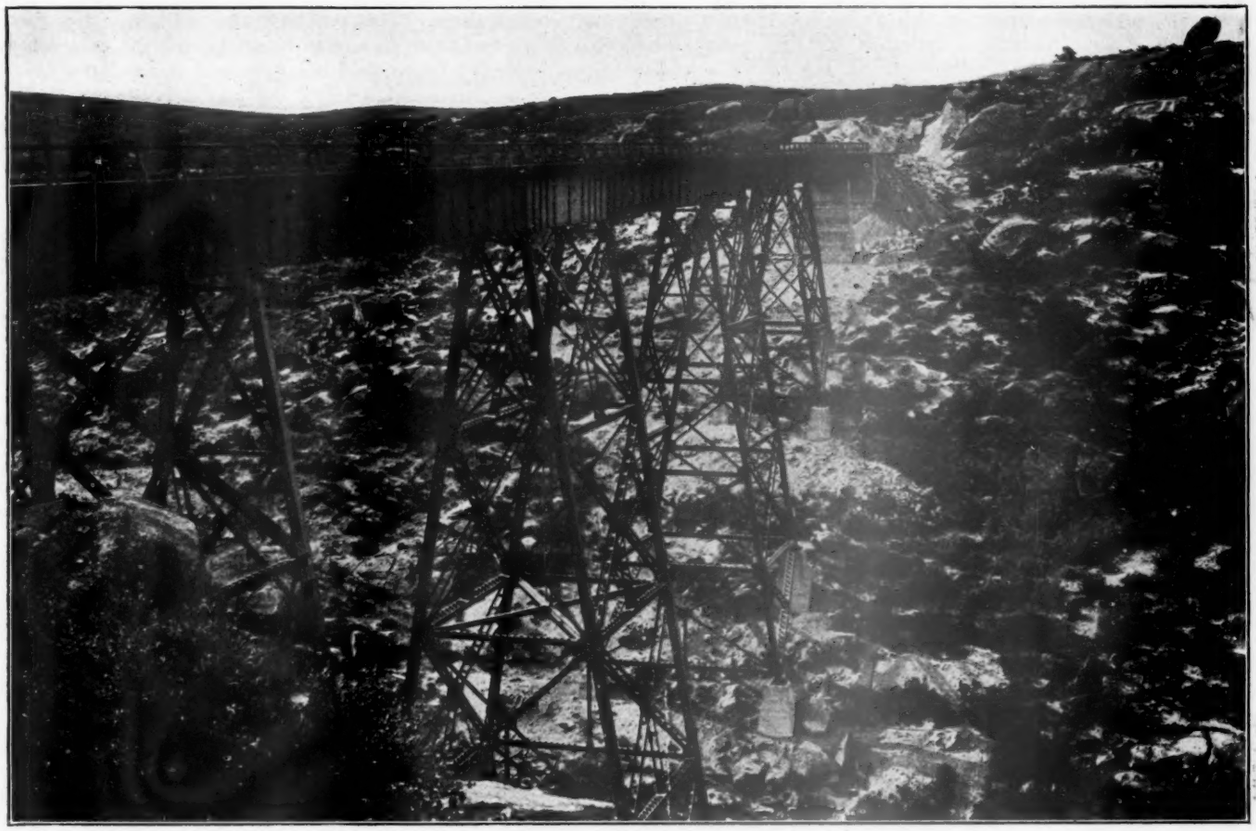
TO THE EDITOR:

I have read with interest the article written by a Mechanical Engineer on Government standards for freight car repairs, published in the *Railway Age* of February 28, page 487, and I wish to first note that Mechanical Department Circular No. 8, in my opinion, is a step in the right direction. The requirements, however, in some parts may be thought by some engineers to be a step too far; but if there are any mistakes in these requirements, the proposal to use friction draft gears in repairing old cars is not, in my opinion, one of them. I am sure that a friction draft gear is a good thing upon new cars, and it is doubly necessary upon old cars that are in constant use, mixed up with new cars.

The conclusion of the writer of the article above mentioned is that spring draft gears are a better appliance for old cars that are repaired with draft arms. I wish to point out what I think to be a fact in regard to the use of friction gears in connection with draft arm appliance to wooden underframes. The writer says that draft arms have proved satisfactory. I am sure that this has been the case, but if, as he says, draft arms have proved their worth with the use of spring gears, they have also doubly proved their worth with the use of friction gears. So far as the car being better protected with a spring gear when the line of draft is below the sills, as when draft arms are applied to wooden underframe cars, I am sure if a little thought is given to this, the error of this conclusion will be appreciated. All of the draft arms which I have seen are of greater strength than the final force necessary to close any friction draft gear recommended by the authors of Circular No. 8 and the statement that after the spring gear goes solid the horn of the coupler will transfer the line of force more nearly to the center of the sills is probably true if the support for the horn of the coupler is strong enough; but as it usually is made of a block of wood or of metal supported by wood, it soon is pounded back and the draft arm gets all of the force even after the draft gear has gone solid. The M. C. B. recommended practice of making the draft arm extend 30 in. or more behind the center line of bolster makes the draft arm of sufficient strength to well support the downward tendency of the average wooden car.

The small capacity of a twin or tandem spring draft gear gives practically no protection to the car and as soon as this spring gear goes solid the underframe or sills of the car must absorb the balance of the energy in an impact between two cars. This remaining energy often is enough to cause several hundred thousand pounds' pressure on the end of the car; while if a car of this description is equipped with a friction draft gear having three or four times the capacity of the spring gear there will be many shocks that would overstrain the car equipped with the spring gear which would not close the friction gear and thus the end force would be kept below that necessary to close the friction gear. In any case if the force of impact was enough to close the gear, the line of draft would be the same in both cases, that is, on the center line of draft, after the horn of the coupler had imbedded itself into the striking block. I, myself, think that those who originated Circular No. 8, which recommends friction draft gears, took a step that is bound to protect cars and their lading.

LOUIS E. ENDSLEY,
Professor of Railway Mechanical Engineering,
University of Pittsburgh.



Campo Creek Viaduct

Heavy Railway Construction Along Mexican Border

San Diego & Arizona Is Driving 17 Tunnels in 11-Mile Gap Nearing Completion in 148-Mile Line

THE SAN DIEGO & ARIZONA RAILWAY is now completing a line extending east from San Diego, Cal., 148 miles to a connection with the Southern Pacific at El Centro, which involves an expenditure of approximately $16,500,000 and includes some exceedingly heavy and difficult construction work. This line, which provides a direct eastern outlet for San Diego, is owned half by the Southern Pacific and half by J. D. and A. B. Spreckels. Its construction was undertaken 12 years ago, but its completion has been delayed by a series of unexpected obstructions so that progress has been slow until the past year.

Leaving San Diego, the road passes in a southerly direction for a distance of 15 miles to Tijuana, where it enters the Republic of Mexico. It then turns in an easterly direction, generally parallel to the International border, passing through Mexico for a distance of 44 miles before again entering California at Lindero, from which point it continues to El Centro, 148 miles from San Diego, where it connects with the Southern Pacific line in the Imperial Valley. The road is now completed from San Diego to the head of Carriso gorge, a distance of 98 miles and from El Centro to the foot of Carriso gorge, a distance of 39 miles, leaving 11 miles yet to be completed in the gorge.

The construction through this gorge involves some of the most expensive railway work that has ever been undertaken in the United States. This 11-mile section contains 17 tunnels, ranging from 180 ft. to 2,650 ft. in length, and with an aggregate length of 13,392 ft., while the line between the tunnels is carried on a bench cut in the side of the mountain from 250 ft. to 350 ft. above the bottom of the gorge. This heavy work is compensated for in a measure by the contour on the western end of the line where it crosses a level plain for 30 miles.

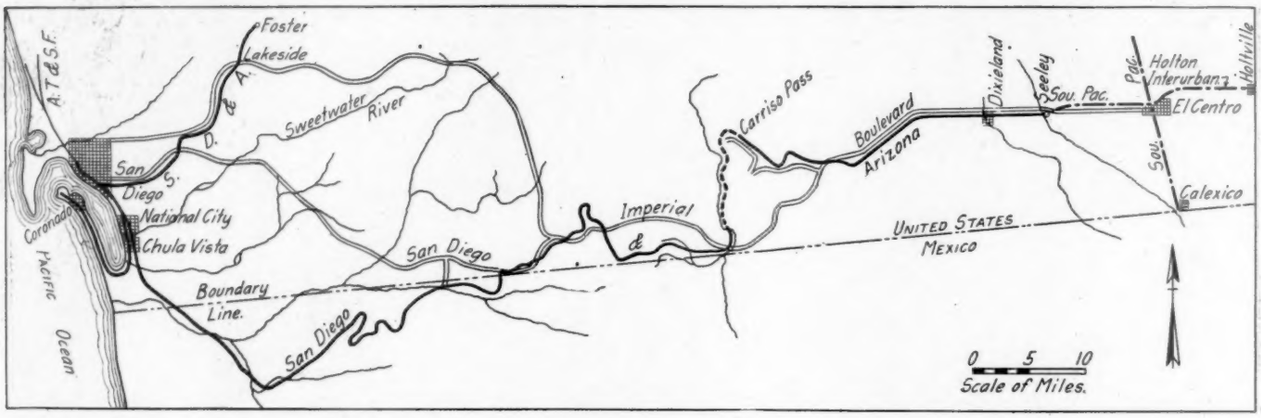
Starting from San Diego the line rises on a practically continuous grade for 85 miles to the summit which is at an elevation of 3,657 ft. above sea level. The maximum grade eastbound is 1.4 per cent which is practically continuous for 47 miles. Westbound the line rises from an elevation of 44 ft. below sea level at Seeley, 10 miles west of El Centro, with a maximum grade of 2.2 per cent for 15.28 miles near the foot of the slope and again for 6.91 miles at the summit and with a 1.4 per cent grade for 15 miles between. This line through the gorge possesses unusual scenic attractions, the coloring resembling that of the Grand Canyon of the Colorado in appearance. The section of the line through the gorge will be protected by block signals.

The completion of this line will enable through train service to be inaugurated between San Diego and the East in connection with the Southern Pacific and its eastern connections and will form a new transcontinental line into San Diego, effecting a saving in distance of approximately 135 miles between Chicago and San Diego. This line also affords a direct outlet for the Imperial Valley of Southern California, one of the most productive valleys in the world. The

area now under irrigation in this valley is 523,600 acres while the acreage under cultivation is 400,000. An additional 100,000 acres are "under the ditch" but not yet actually irrigated while approximately 100,000 acres are now under cultivation across the line in Mexico. The total irrigable area in this valley is 800,000 acres while 200,000 acres additional can be reached by pumping. In January, 1901, there

and lemon culture. This purchase also includes a line from San Diego to Coronado and to North Island, the government army and navy flying field being located at the latter point.

The San Diego and Arizona Railway line crosses the Laguna range in the passage of which it traverses some exceedingly rugged country requiring heavy construction, particularly in the vicinity of Carriso Pass as referred to above.

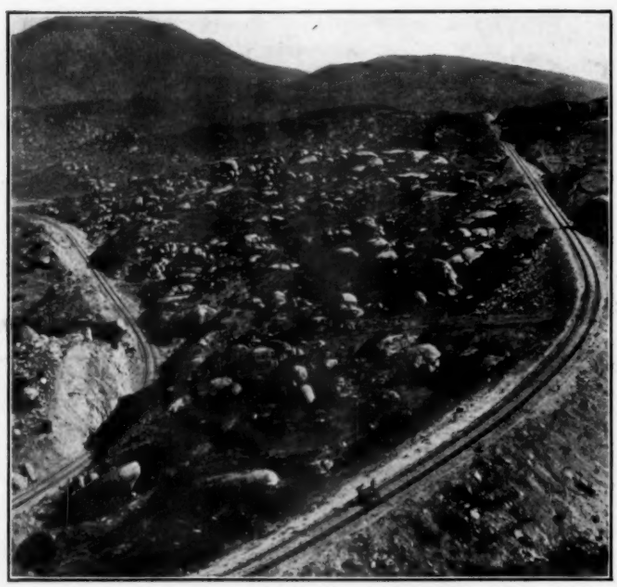


Map Showing the Location of the San Diego & Arizona

was no white man in the Imperial Valley. Today it has 10 towns and a population of 50,000. The crops for 1918 were valued at $40,000,000, and included 11,330 cars of barley, 3,300 cars of corn, 32,540 cars of hay, 1,925 cars of cotton, 3,560 cars of canteloupes and 1,100 cars of cattle.

Much of the traffic from the Imperial Valley will move to San Diego for export to China and Japan and for loading on seagoing vessels for shipment through the Panama Canal, San Diego being the nearest port in the United States to the canal. The city of San Diego has recently completed a municipal dock with 53,200 sq. ft. of floor area and other docks are soon to be built to handle this export traffic.

In October, 1917, the San Diego & Arizona Railway pur-

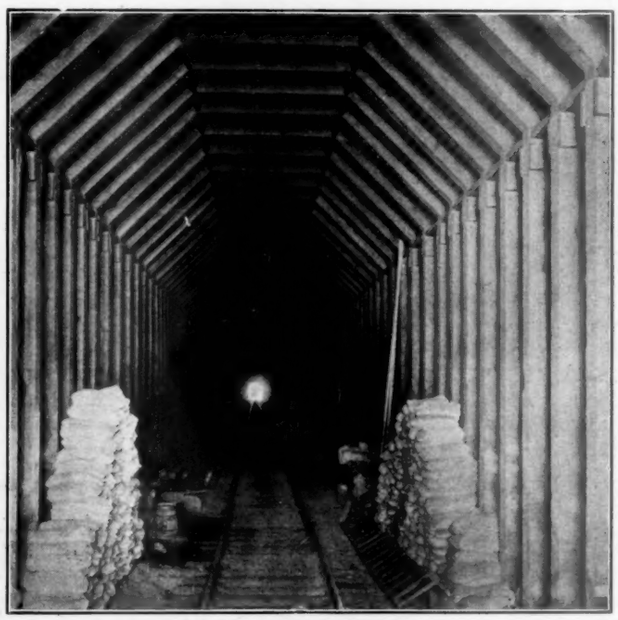


A Section of the Line in Mexico

chased the San Diego & Southeastern Railway, with 43 miles of line serving the country immediately tributary to San Diego, including El Cajon Valley, noted for its raisin, orange

Through this pass the maximum grade was held down to 1.4 per cent because the cost of reducing this at a later date would be prohibitive. Elsewhere grades up 2.2 per cent were permitted. The maximum curvature on the permanent line is 10 deg.

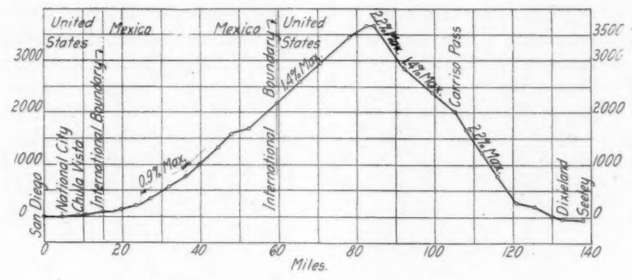
In the section between Jacumba and Carriso gorge there



Interior of a Timber Lined Tunnel

are 17 tunnels with a total length of 13,392 ft. Of these, two are about 2,650 ft. long, and about 1,200 ft. respectively and the remaining 15 are between 180 and 900 ft. in length. Although the rock was quite hard, the formation was loose so that 75 per cent of the total length in tunnel required timbering. In Carriso gorge itself there was ten miles of almost continuous rock cut so that altogether the section of the line near the pass had exceptionally heavy construction costs. Another item of additional cost, resulting from

the rugged territory traversed, was the fact that no road had previously been built along the route followed by the railway. A wagon road, therefore, had to be constructed on



Profile of San Diego & Arizona

which to bring in supplies. The cost of the roadway serving this section of the line was about $100,000.

In one instance a compressor plant for construction purposes was located at the bottom of Carriso gorge, the machinery, lumber and other materials for which had to be hauled in over the wagon road and then over another road built down the side of the mountain to the site of the plant, for there was not sufficient space available to erect the plant on the side of the mountain. At this point the railroad is about 700 ft. above the bottom of the gorge.

The largest structure on the line is a steel viaduct at Campo Creek which is 580 ft. long and 180 ft. high, costing $112,000. In planning for the placing of the large girders of this structure an ordinary locomotive crane had been provided with a 60-ft. boom, reinforced with cables and set up on a freight car to which the locomotive crane truck was attached. When the towers were completed an endeavor was made to place the long girders, holding them steady in the wind by means of block and tackle attached to each end.

Before the work had progressed far it was noticed that as soon as the steel work had been carried up some distance from the ground, a wind velocity was encountered which did not exist near the ground. As the work advanced, this became more serious and caused delay. Even the painting was held up by the high winds.

The first attempt to erect the girders was unsuccessful, because of the wind and it was decided to await more favorable conditions. The wind proved to be almost continuous however during daylight hours at least, and the attempt was repeated many times before the girders were finally set. When this was accomplished 300 hr. time had been charged against the locomotive crane in the work of handling the girders, instead of the 40 or 50 hr. that would have been sufficient had it not been for the high winds.

The same difficulty with wind affecting other parts of the work so delayed the erection of the viaduct that the construction required three times what it should have under ordinary conditions; that is, the viaduct required 6 months for completion instead of 60 days.

A Section of the Line Under Construction in Carriso Gorge

In designing this viaduct, it was decided to use 100-ft. girders on one of the spans and to lift them bodily into position. Considerable interest attached to the job because no girders of equal length had previously been so placed on the lines of the Southern Pacific.

The viaduct has a total length of 580 ft. and consists of six spans, two of which are 80 and 100 ft. long respectively. At the central point the track is about 180 ft. above the bed of the stream, the highest tower having a base length of 50 ft. parallel to the track. The towers were designed to be self-sustaining during construction and were erected by the usual structural method, piece by piece. Materials were delivered to the site of the viaduct by motor truck, and were hoisted by a donkey engine with two lines running to a carrier on a cableway spanning the viaduct site.

At the present time it is expected that the entire line will be completed and placed in operation during the latter part of the coming summer. The tunnels in the 11-mile section remaining unfinished are over 75 per cent completed. The shops, engine houses and other buildings necessary for operation are nearly ready while work on the remaining buildings will be undertaken within the next few weeks.

This line is being built under the direction of J. D. Spreckels, president; D. W. Pontius, general manager, and E. J. Kallright, chief engineer. We are indebted to Mr. Kallright for the information contained in the above article.

Railroad Purchases as a Stabilizer of Business

Fluctuations and Uncertainties Seriously Affect General Industrial Situation

By F. B. Ernst

AN AVERAGE annual purchase of materials and equipment by the railroads of the United States would assist appreciably in the stabilization of business. Under their own control, railroads, like individuals, bought when they had money and curtailed drastically as soon as earnings began to decrease. No other alternative was open to railroads of uncertain financial standing and in recent years it has been necessary even for roads in stronger positions to follow this plan due to the greater difficulty of obtaining money and the none too friendly attitude of the public. During times of depression in business few cars were purchased, while during boom times cars were ordered far beyond the capacity of the carbuilding plants. A more uniform program of buying alike over good and bad times would have resulted in considerable economy and great industrial advantages to the manufacturers and employees as well.

In Charts Nos. 1, 2, 3 and 4 are shown the number of freight cars, passenger cars, and locomotives purchased and built per year during the period 1901 to 1918 inclusive. These charts were prepared from statistics published yearly in the *Railway Age*. Consider, for the purpose of illustration, freight cars only. The great variation from year to year in the number of these cars purchased is amazing. The greatest variation is shown during the period from 1905 to 1908, when from more than 340,000 cars purchased in 1905 the number decreased three years later in 1908 to less than 65,000 cars—18.4 per cent of the number purchased three years before. While this is somewhat extreme, the chart shows a series of wide fluctuations from "feast to famine" over the entire period of 19 years. The difficulties of the manufacturer in regulating his organization to meet these fluctuations and the disadvantages to the railroads of operating on this basis are apparent.

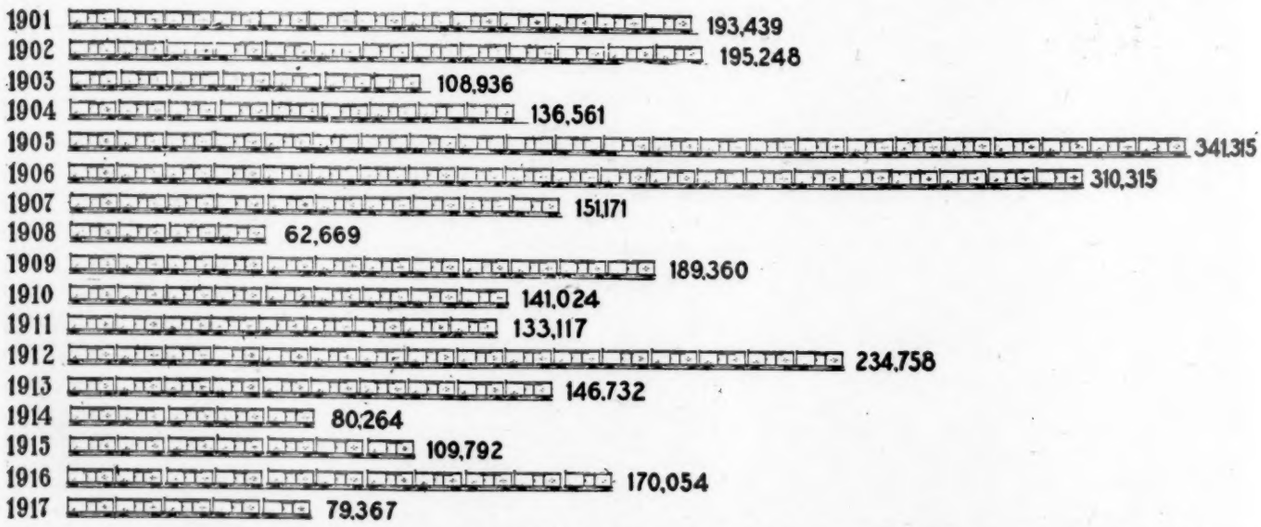


Chart No. 1—Showing Graphically the Number of Freight Cars Ordered for Domestic Use During the Past 17 Years

The Manufacturers' Problems

The manufacturer during normal or boom times builds up a complete organization and the shops are operated to full or even beyond their rated capacity. A year or two later there may be only sufficient work to operate the plant at 50 per cent, or even 30 per cent of capacity. This necessitates

the laying off of a great number of men and disrupting the organizations which had required years to build up. Entire communities surrounding large carbuilding or railway specialty plants are in a state of depression; the workmen who had become trained in the carbuilding industry must seek employment in other lines. These men are naturally not available a year or two later when the plants are again

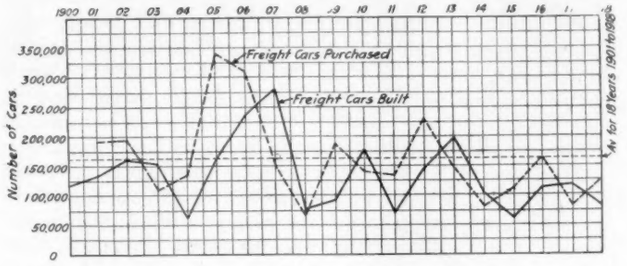


Chart No. 2—Showing Variations in the Number of Freight Cars Purchased and Built During the Past 19 Years

placed in operation, and it is necessary to train new and inexperienced men for the work.

The conditions are unfair to the men in that their work is not permanent and their living is transient. Difficult

TABLE NO. 1—FREIGHT CARS ORDERED AND BUILT FOR EACH YEAR SINCE 1901

Year	Domestic orders per year	Cars built per year
1899	.....	117,982
1900	.....	113,070
1901	193,439	132,591
1902	195,248	161,747
1903	108,936	153,195
1904	136,561	60,955
1905	341,315	162,701
1906	310,315	236,451
1907	151,711	280,216
1908	62,669	75,344
1909	189,360	91,077
1910	141,024	176,374
1911	133,117	68,961
1912	234,758	148,357
1913	146,732	198,066
1914	80,264	104,541
1915	109,792	59,984
1916	170,054	113,692
1917	79,367	119,363
1918	123,770	81,767

financing is necessary and workmanship, particularly of new men, in the rush of plants running beyond their rated capacity, naturally is not satisfactory. With a more uniform output, the same laborers would continue in one line of work,

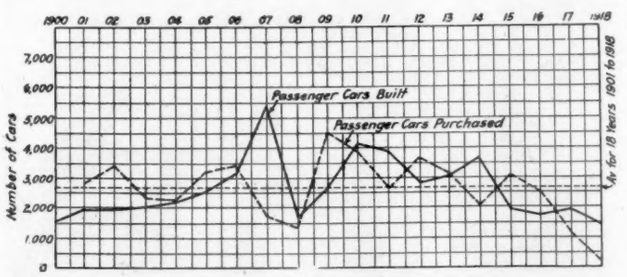


Chart No. 3—Showing Variations in the Number of Passenger Cars Purchased and Built During the Past 19 Years

become more efficient, and a better class of work and lower costs would result. Carbuilding companies would benefit further in having uniform financial obligations from year to year.

The average number of freight cars purchased for the entire 19-year period, 1901 to 1918, including the lean years at the opening of the war, was 161,635 per year. Assume for the purpose of illustration that the yearly requirements of the railroads, to take care of their normal business, is approximately 170,000 freight cars. While the tonnage to be hauled increases from year to year, this has been largely provided for in the larger capacity of the individual units of equipment and the greater efficiency, at the present time, in the method of handling freight.

To meet this annual program of car construction the car-

TABLE NO. 2—PASSENGER CARS ORDERED AND BUILT FOR EACH YEAR SINCE 1901

Year	Domestic orders per year	Cars built per year
1899	.....	1,201
1900	.....	1,515
1901	2,879	1,949
1902	3,459	1,948
1903	2,310	2,007
1904	2,213	2,144
1905	3,289	2,551
1906	3,402	3,167
1907	1,791	5,457
1908	1,319	1,645
1909	4,514	2,698
1910	3,881	4,136
1911	2,623	3,938
1912	3,642	2,822
1913	3,179	3,076
1914	2,002	3,691
1915	3,101	1,935
1916	2,544	1,769
1917	1,167	1,969
1918	131	1,481

building capacity of the United States should be approximately 170,000 cars per year. As a matter of fact the capacity in the United States is almost double this figure, made necessary in providing for the larger number of cars

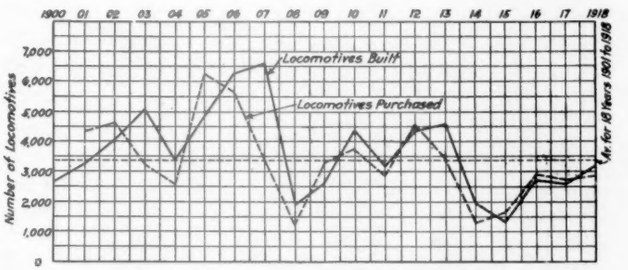


Chart No. 4—Showing Variations in the Number of Locomotives Purchased and Built During the Past 19 Years

ordered during prosperous years. This excess represents an economic waste, as many of these plants stand idle during all but boom times. If, however, a definite number of cars were ordered each year the carbuilding industry could adjust

TABLE NO. 3—LOCOMOTIVES ORDERED AND BUILT FOR EACH YEAR SINCE 1901

Year	Domestic orders per year	Locomotives built per year
1899	.....	1,951
1900	.....	2,648
1901	4,340	3,384
1902	4,665	4,070
1903	3,283	5,152
1904	2,538	3,441
1905	6,265	4,896
1906	5,642	6,232
1907	3,482	6,564
1908	1,182	1,886
1909	3,350	2,596
1910	3,787	4,441
1911	2,850	3,143
1912	4,515	4,403
1913	3,467	4,561
1914	1,265	1,962
1915	1,612	1,250
1916	2,910	2,708
1917	2,704	2,585
1918	2,802	3,668

itself to take care of the normal amount of equipment required and there would be eliminated the overwhelming peaks of prosperous times and the discouraging recessions of poor times. Inasmuch as the carbuilding plants on this basis could operate more economically, the results would

eventually be lower prices to the railroads, better workmanship and more uniform equipment.

How the Railroads Are Affected

The situation from the standpoint of the railroads is equally unsatisfactory. With business at a low ebb, the railroads contribute further to this depression by withholding orders and depriving themselves of the great tonnage incident to the building of cars and locomotives. This tonnage at such times could be hauled at little additional expense, as train crews must be maintained and cars and locomotives are available. With the freight movement below normal, this additional tonnage would come when badly needed and would increase very materially gross and net receipts. As it is, large numbers of cars and locomotives stand idle, and there is not sufficient freight fully to utilize the carrying facilities of the roads.

A year or two may pass. The country may then enter on a period of increased business activity. The railroads find themselves confronted with great quantities of freight to be moved and do not have the necessary equipment to move it, owing to the fact that during the two or three previous years of depression few new cars or locomotives were built and the equipment on hand had not been kept in good repair. The railroads are embarrassed and the business of the country is handicapped by the fact that the roads do not have sufficient equipment for moving the freight that is offered. Yards and terminals are congested, and as a consequence freight not only moves slowly but is carried uneconomically. All the roads enter the market for cars and locomotives and, allowing for the time required to build up new organizations in the carbuilding plants, train new men, and secure materials, most of the cars are not actually available for service for six months or even a year after they are ordered.

In Chart No. 2, it may be seen that the peaks and depressions of carbuilding occur about six months to a year later than the corresponding peaks and depressions of car buying. If there had been uniform annual buying, equipment ordered during poor times would be immediately available for the increased tonnage resulting in boom times. To the already over-burdened roads is now added the great quantities of material required in the building of equipment. This additional tonnage comes at a time when it is not needed by the roads already operating at 100 per cent capacity. In fact, the additional revenue obtained is largely given out in overtime and premiums which must be paid because of the roads operating on an over-capacity basis. It would have been infinitely better if the railroads could have had this extra freight at less prosperous times when they were badly in need of tonnage.

Effect Upon Allied Industries

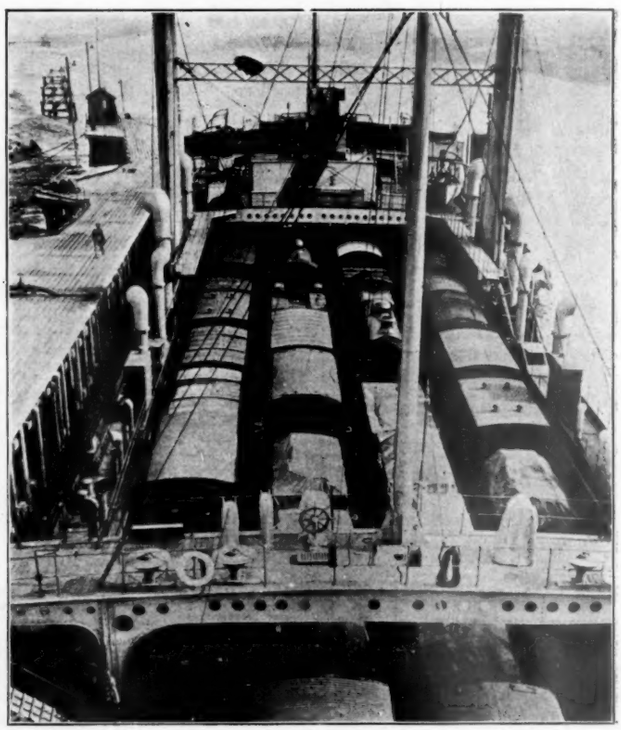
The building of railroad equipment in poor times would stimulate many other dependent lines, as in the building of ordinary freight cars there are required considerable quantities of structural steel, cast steel, forged steel, malleable iron, cast iron, lumber, brass, springs, bolts, nuts, etc. In an ordinary 50-ton steel gondola car, for example, there would be required about 12 to 15 tons of structural and plate steel. In connection with the manufacture and use of this steel, pig iron, coal, coke, limestone, scrap and other ingredients, representing several times the tonnage of the finished steel, must be handled by the railroads. Stimulation of these various lines of industry, dependent upon the steel industry, likewise stimulates other lines in turn dependent upon them, so that the effect is far-reaching in its fan-like extensions to the various dependent lines.

It is estimated that in the manufacture of steel castings, such as couplers, bolsters, side frames, wheels, etc., the tonnage of raw materials, etc., to be hauled is three to four times the weight of the finished product, and it would probably not be far wrong to assume that a finished freight car weighing 20 tons, would be productive of not less than 60 to 80 tons of freight to the railroads. Stimulation of other dependent manufacturing lines would add materially to this figure. On this basis, the total tonnage involved would help considerably during periods of depression and would also be of material relief to the railroads in freeing them of this additional tonnage during boom times when it is not wanted.

The above discussion has dealt largely with freight cars, and incidentally with passenger cars and locomotives; that is, with motive power and rolling stock. The plan would apply equally as well to the maintenance of way department, as well as shops, roundhouses and terminals, and would add to the stabilizing effect which the railroads could exert.

The principal reason why railroads when under their own management, did not avail themselves of the advantages of a more uniform program of purchasing, was, in most cases, that of finance. Even those roads that were financially able, as a rule followed the conservative curtailment which always accompanies periods of uncertainty and depression. While the carbuilders of the United States, now operating largely on the recent lot of Railroad Administration cars, still have a reasonable amount of work ahead, many of the railway supply companies have already begun to curtail operations, with apparently no relief in sight in the way of new orders which will be available in time to prevent practical shutdown. Carbuilders will be in a similar position a few months hence.

Whatever the future of the railroads, the government should continue to exercise supervision that will perpetuate certain practices in administration and operation that have unquestionably proven of value. To these should be added some plan providing for more uniform annual purchases of equipment and supplies. The idea of equalized purchases by the railroads could be extended to a much broader field, in fact, to the government itself, and the opportunities are such as possibly to justify a branch of "Business Stabilization" in some one of the departments at Washington.



Copyright by Underwood & Underwood, N. Y.

The English Channel Train Ferry at Its Berth

Doings of the United States Railroad Administration

Prices Recommended by Industrial Board of Department of Commerce Still Under Discussion

WASHINGTON, D. C.

THE CONTROVERSY over the price to be paid for steel, which also involves the entire question of the policy to be pursued by the Industrial Board of the Department of Commerce, has occupied the attention of a large part of official Washington during the past week. The question of steel prices, and particularly the prices to be paid for rails, was discussed at a meeting of the Industrial Board on Saturday, April 5, with R. S. Lovett and Henry Walters, members of the Advisory Committee on Purchases of the Railroad Administration, H. B. Spencer, director of the Division of Purchases, and Commissioner McChord of the Interstate Commerce Commission, at which the railroad representatives presented arguments for lower prices for rails than those of $45 and $47 a ton agreed to by the Industrial Board, but no conclusion was reached. Director General Hines also discussed the subject with George N. Peek, chairman of the Industrial Board, on Tuesday, but no conclusion was reached and another conference was arranged for Thursday, at which it was hoped some definite development would be reached.

Mr. Peek had issued a statement on April 4, denying that the board had adopted hard and fast policies that would not be subject to change under any circumstances. "I have never said or intimated that the Industrial Board would stand pat on the prices formulated with the steel industry no matter what objections were brought up by other departments," Mr. Peek said. "Shown a good and sufficient reason for doing so, the board will reconsider." One of the principal points made by the Railroad Administration is that the Industrial Board had officially announced the steel price schedule over the protests of the Railroad Administration and before such reconsideration. The Railroad Administration has been studying the figures on steel production costs as compiled by the Federal Trade Commission and believes that the prices announced are too high to offer it any inducement to enter the market.

On the other hand it is understood that the Industrial Board has laid before the Railroad Administration data showing that of the five principal steel companies involved in the production of rails, two have production costs in excess of the rail prices agreed upon, two can produce at the price without counting overhead, and one, which has an output exceeding by more than 50 per cent the combined production of the other four, can produce at a cost low enough to show some profit at the price named, but a narrower margin of profit than it received during the pre-war period. It is understood that the steel companies also have stated to the board that in some instances the rails produced during the past year on pre-war contracts have been delivered at a loss to the steel companies.

Railroad men, however, point to the fixed price of $28 a ton which prevailed before the war as having given the steel companies a handsome profit for years. The Federal Trade Commission's figures show that the U. S. Steel Corporation's cost for producing rails in October, 1918, was $40 a ton, for open-hearth, including $4 of inter-company profits, so that $47 a ton would give a profit of $11. E. H. Gary was quoted in a New York paper on Tuesday as saying the cost in January was $40 for open-hearth and $46 for Bessemer. The price for steel billets named by the Industrial Board was $38.50 a ton, and it has been calculated that adding 50 per cent more than the pre-war differential to this would give $41.36 as a price for open-hearth rails.

As a result of the conference of the representatives of the government purchasing departments with the Secretary of the Treasury and the Secretary of Commerce on April 2, the entire question of the policy to be pursued by the Industrial Board was reopened for further consideration. The vague statement issued by Secretary Glass at the close of the conference indicated that this would be done, but it was amended later in the evening by Chairman Peek of the board to indicate only that the question of steel prices was to be further discussed with the Railroad Administration. Secretary Glass made it plain on the following day that Mr. Peek's amendment of the statement was unauthorized. The entire plan of price stabilization in an effort to stimulate industry was originated by Secretary Glass, who turned it over to Secretary Redfield to carry out. The controversy which has arisen, with Secretary Glass and the Railroad Administration on one side and Secretary Redfield and his Industrial Board on the other, springs from a difference of understanding as to the function of the board, as well as over the price of steel. The Railroad Administration and Secretary Glass understand that it was appointed to act as a mediator rather than as an arbitrator, to attempt to bring about an agreement with the producers on prices which would be sufficiently attractive to the government purchasing agencies, of which the Railroad Administration is the largest buyer, to induce them to buy freely on the assumption that the general public would regard the prices accepted by the government as fair. The first public statements regarding the formation of the board bear out this idea, but apparently the board had a larger view of its authority and assumed to establish official prices. T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration, and its representative on the board, distinctly notified the board that the Railroad Administration would not buy steel at the prices fixed. The Railroad Administration takes the position that until a price was reached which would be satisfactory to it, the board had failed to accomplish its intended functions and that there was nothing to announce, but the board gave out a scale of prices, proposed by the steel interests and somewhat modified by the board, as the official scale, while Mr. Powell's membership on the board created the general impression that the Railroad Administration was a party to the agreement. The fact was that the announcement was not made until nearly two weeks after the prices had been announced nor until after the administration had come in for considerable criticism for its failure to give effect to the plan by placing orders at the prices fixed.

On January 1 there were on order undelivered about 1,100,000 tons of rails, which were being delivered at the rate of about 40,000 tons a week. This has now been reduced to about 35,000 tons, as one of the steel companies has completed its orders and another company will soon be out of orders.

At this rate the administration still has about 600,000 tons to come, which would run till about September 1.

The question of steel prices as affecting the Navy Department has also come up. Acting Secretary of the Navy Roosevelt announces that under the laws the department is required to advertise for bids, but when bids were opened on April 4 for a considerable tonnage of structural steel they were all found to be based on the prices announced by the board, and the department has not yet announced its acceptance or rejection. The Shipping Board has announced

its acceptance of the scale as a basis for future contracts, but stated that few new contracts are now being let because its requirements have been so largely contracted for ahead. The War Department has asked for bids on coal to be opened on May 7.

In relation to sand, gravel and crushed stone, the Industrial Board has announced that owing to the large number of firms and individuals engaged in the business, and the local character of their operations, competitive conditions within the industry are so definite and persistent that nothing more can be done by the board than to recommend a continuation of the practice of competitive bidding in governmental purchases.

The Railroad Administration was also criticized by the National Coal Association for not awaiting the action of the board before proceeding to make purchases in the open market under competitive conditions. It is understood that Mr. Hines takes the position that he can manage his own purchases without the assistance of the board and that it has no purpose unless it can secure better prices than he can. Under the theory that the board should act as an arbitrator of prices, he regards the plan as illegal and it is understood that the Department of Justice takes the same position, although the question has not yet been put up to it in concrete form. Secretary Redfield cabled to the President asking him to instruct the government departments to accept the board's prices, but there have so far been no indications that the President would intervene in any way.

Pending the settlement of the steel price question, a decision in the controversy with the coal association has also been held in abeyance while the administration continues to pursue its policy in negotiating for coal without reference to any proposed price-fixing. This has led to the issuance of various statements by both sides. Mr. Hines on April 3 issued a statement which was in effect a reply to the coal operators' charge, in which he referred to "the interesting fiction that the Railroad Administration is conducting its purchase of coal in such a way as to force producers to sell to it below the cost of production, thus in turn forcing them to increase their prices to the rest of the community."

"The assertion of this fiction," he said, "seems to carry with it the suggestion that in order to prevent the Railroad Administration from accomplishing this purpose, it is important to find a way to remove all competition in bidding for such government business and instead to fix in the respective mining districts uniform prices at which all producers would be willing to sell and at which the Railroad Administration would have to buy. The remedy thus suggested for this fictitious evil would, of course, have the result of giving the coal operators the relatively high prices fixed without any competition, which they could use as a basis for selling to the general public, so that the element of competition would fade from the picture and virtually the whole consuming public would be paying prices which in the aggregate would be far in excess of what would be necessary to maintain existing wages and pay sufficient profits.

"While it hardly seems necessary to do so, I wish to give the country the assurance that the Railroad Administration has no such unjust and shortsighted purpose as to force producers to sell below cost or impose a burden on the rest of the public. There is no institution—public or private—in the country that has a greater interest in the promotion of prosperity than the Railroad Administration has, because the more the business of the country increases the more net revenues the Railroad Administration will enjoy. At the same time I believe it would be opposed to the interests of the general consuming public, as well as of the government, to forego absolutely all benefits of competition and buy coal for the government at unnecessarily high prices, which in turn will immediately become the standard prices for all purchasers. Such a course would have a strong tendency to continue to preserve in the present period following the war, profits having entirely too strong a resemblance to the extraordinary profits which were realized during the war."

As an illustration of the caution which the Railroad Administration is observing in this matter, Mr. Hines said, it has established the policy that each railroad shall buy its own coal, thus avoiding any greater concentration of purchasing power than existed under private management. It has also instructed that in purchasing coal, railroads must take into consideration the director general's policy to make as wide a distribution of the tonnage bought as conditions will permit, considering quality, transportation and price, at the same time confining so far as practicable, purchases to producers on the individual roads. It has also directed that no railroad should accept any bid which would involve the cutting of the existing scale of mining wages. It has further provided that coal prices actually contracted for shall not be secret, but shall be available for the information of any interested coal operator and also of the miners. Very few specific instances have been brought forward of failure on the part of any railroad to observe these policies, and the complaints which have been brought forward have been and are being properly adjusted. Most of the complaints appear to have been made to the press rather than to the Railroad Administration.

"It must be remembered that the purchasing power immediately available of the Railroad Administration with respect to coal is by no means as great as is generally assumed in discussions on this subject," Mr. Hines added. "To a large extent the Railroad Administration's current supply of coal must be taken on unexpired contracts which were made many months ago and which have yet several months to run. Again, the volume of coal currently consumed by the Railroad Administration at the present time is decidedly below the normal, because in the present readjustment period the business handled is below normal. A further factor which cannot be ignored is that the railroads, like enterprises generally, stored unusually large quantities of coal last April to be prepared for the exigencies of a long continued war. To meet the present situation the railroads are using this stored coal with caution so as not to interfere unduly with current coal production, but a considerable storage of coal still exists, which eventually will have to be used by the railroads."

The National Coal Association then issued another statement, saying that a request that all bids on railroad coal be made public had been refused and that the only information made public is as to the price at which the business is finally placed. "Despite the director general's public statement of February 19 that this information would be available to any interested party," the statement added, "it has been refused coal operators and their accredited representatives as late as the 28th day of March on the ground that local representatives of the Railroad Administration have no instructions to give out such information.

"In short, the bituminous coal operators have endeavored to obtain the co-operation of the United States Railroad Administration in an effective manner to deal with a question which they consider of vital interest to the general public. The Industrial Board appears to them to afford a medium by which a practical solution of the difficulties could be obtained with all the rights and interests of the general consumers of coal entirely safeguarded. They are still ready to co-operate with this board and the director general of railroads in what to them seems an eminently broad and sensible program to meet an extraordinary condition."

To this Mr. Hines replied in part as follows:

"It is of the highest importance that every consumer of coal and every person interested in the high cost of living

should understand exactly what is involved in the effort of the National Coal Association to escape competition and get its members again under cover of government prices for coal. The statement issued last night by the coal association makes it perfectly clear that it is trying to prevent competition or, as it euphemistically expresses it, its members have 'declined to discuss prices,' and instead is trying to get some governmental agency to assume the responsibility for naming a uniform price for coal in each district. Such a uniform price will have to be high enough to take care of the greater costs of the high cost producers and thus produce an excessive profit for the low cost producers. The Fuel Administration removed its prices some time ago. The question is whether the public now wants other government prices established so as to continue to keep coal at high price levels which will keep up the cost of living and continue to produce in the aggregate abnormal profits to the coal operators.

"Their present proposal is that the government fix in each district a uniform price (without any opportunity for competition) at which the Railroad Administration and other government agencies must purchase. But the effect of this will immediately be to create a standard which the coal operators will try to maintain in selling to everybody else and the government will be giving its support therefore to a price level which will be unnecessarily high and far more than is necessary to yield a handsome profit for the low cost producers. I firmly believe that any such policy is opposed to the interest of every member of the community who is suffering instead of profiting by the present high cost of living.

"In an enterprise involving the operation of 250,000 miles of railroad and perhaps 150 different railroad organizations, it is natural that there may be specific instances where there will be temporary shortcomings in carrying out the definite policies of the administration. Such shortcomings will be promptly corrected as they arise and will become less frequent as the policy is more clearly understood. But the mere fact that they may arise is no reason why the American public should continue to be deprived of the opportunity for all competition in the coal business and I have therefore been unwilling to comply with the suggestion that the Railroad Administration withdraw requests for bids and instead undertake to buy its coal at uniform prices for the various districts fixed by some government agency."

The Southern Pine Lumber Manufacturers' Association at a meeting in New Orleans on April 2 announced that it had declined a proposal of the Industrial Board that they enter into a joint price agreement. In reply to this, Mr. Peek stated that neither the Southern Pine Association nor any other representative industry has ever been invited to enter into a price agreement, but that they had been invited to co-operate with the board in an effort to stabilize prices by getting industries voluntarily to make prices as low as present cost and labor conditions will justify.

Plans for Additional Temporary Financing

The most pressing April 1 requirements of the railroad companies having been met by temporary financing on certificates of indebtedness issued by the Railroad Administration, the committee representing the Association of Railway Executives, of which Howard Elliott is chairman, has been conferring this week with Director General Hines, the War Finance Corporation and the bankers, on the measures to be adopted to take care of the further requirements until the Railroad Administration can secure its appropriation from Congress. Although it is hoped that Congress will be called in extra session, possibly by June 1, it is necessary to provide for the contingency that the date may be later and that there will be some delay before the bill is passed, and the conferences with the director general have been based on the probable requirements up to August 1. It is estimated that the requirements of the railroad companies up to that time for interest, dividends and other corporate expenses, as well as maturing notes and payments for additions and betterments, will be between $400,000,000 and $500,000,000. The amount depends to a considerable extent upon the amount of additions and betterments which it will be possible to provide for.

This $400,000,000 to $500,000,000 it will be necessary to provide for by temporary financing and as the resources of the War Finance Corporation are not sufficient to provide more than $150,000,000 to $200,000,000, it will be necessary to arrange for the balance through the banks, which have already taken care of a large share of the April 1 requirements. These were estimated at approximately $70,000,000 and the Railroad Administration has issued its certificates to the roads making application to the amount of about $54,000,000, but the War Finance Corporation has found it necessary to make loans on their security only to the amount of approximately $30,000,000, while the balance has been taken care of by the banks. The Railroad Administration also advanced about $10,000,000 in cash. The conferences this week have had to do with the arrangements to be made with banks before making loans on further issues of certificates.

The executives' committee held some meetings with Mr. Hines on Monday and both the committee and Mr. Hines conferred with the War Finance Corporation, after which the executives' committee held a meeting with five leading bankers in New York on Tuesday. This was to be followed by a later meeting with Mr. Hines and the bankers. The executives asked Mr. Hines to make an appeal to the bankers to lend their assistance in meeting the situation caused by the failure of the appropriation and the plan discussed was that the War Finance Corporation and the banks should divide the loans made on the director general's certificates under some plan by which the bank loans may be pro-rated among the federal reserve banks by districts. It is understood that the arrangement will be continued by which Mr. Hines will protect the railroad companies against any loss occasioned by the difference between the rate of interest which the certificates bear, 5 per cent, and the rate which they must pay for loans, which has been 6 per cent in the case of loans made by the War Finance Corporation. Mr. Hines has also agreed to make no distinction between the companies which have signed contracts with the Railroad Administration and those which are willing to do so, except that in the latter case he cannot issue certificates for more than 90 per cent of the standard return, after making the deductions for additions and betterments chargeable to the company. In the case of roads that have executed contracts, it is not necessary for the director general to make this deduction and it is hoped that any plan enacted by Congress for the return of the roads will provide a period for repayment to the government of amounts charged against the companies for additions and betterments.

A list of the loans made to the railroad companies by the War Finance Corporation on the security of certificates issued by the director general was published in last week's issue. A large number of the roads, instead of asking loans from the War Finance Corporation, made their loans through local banks.

Standard Freight Cars Held in Storage

Freight cars have come to be about a drug on the market since the signing of the armistice. In addition to the large number of idle cars which have been in service, several thousand of the new standard cars built on the orders placed by the Railroad Administration last year have been completed by the builders, but cannot be stencilled because the railroad companies, which are expected to take them and pay

for them, have not yet accepted them. Over 26,000 of the 100,000 standard cars ordered had been accepted by the roads to March 31, according to a statement compiled by the Railroad Administration, but this does not account for at least 10,000 more that have been built, and are being held in storage until it can be ascertained whether the Railroad Administration can force the companies to take them at the high prices. The administration takes the position that it can, because they were ordered under war conditions and allocated to the various roads, but many of the companies are not in a position to finance them, and meanwhile the Railroad Administration is paying for them at the contract price minus an amount to cover the cost of stencilling. The standard locomotives, on the other hand, are being accepted as fast as they are turned out.

Committee on Automatic Train Control

The Committee on Automatic Train Control will hold its next meeting at Washington on April 15 and on the following day will inspect the automatic stop and cab signal of the American Train Control Company on the Chesapeake & Ohio between Gordonsville and Charlottesville, Va. The committee expects to resume its western trip, which will include Spokane, Wash., San Francisco and Oroville, Cal., about April 28. Thc committee started on this trip last month and inspected the train control system on the Chicago & Eastern Illinois, but postponed the rest of the trip because of the illness of C. A. Morse, chairman. Some 75 or 80 plans for train control devices have been submitted direct to the committee in addition to those which had previously been submitted to the Interstate Commerce Commission, but the number believed to be worthy of further consideration has gradually been reduced and there are now about 36 different devices before the committee for further consideration.

Arrangements for Equipment Financing

Arrangements have been completed for temporarily financing the amounts now due the car and locomotive builders by the Railroad Administration, amounting to approximately $40,000,000, by the issuance of certificates of indebtedness, bearing interest at 5 per cent, which may be used as collateral for loans from the banks or possibly from the War Finance Corporation, but up to Wednesday the certificates had not actually been issued. Some of the certificates, which are to be in convenient denominations for that purpose, will be passed by the equipment companies to the sub-contractors who furnished materials and specialties, but whose contracts are with the builders rather than with the government. For this reason the specialty people were not admitted to the conferences between the builders and the Railroad Administration representatives, but conferences between the sub-contractors and builders were held afterward Some of the specialty men were inclined to insist on being paid in cash rather than certificates, but it is stated that if they insist on cash they will have to wait until it is available, as the companies to whom the certificates are issued will have to give their own notes to the banks and might thus be left "holding the bag" for a time in case of unexpected delay to the railroad appropriation.

Whatever interest above 5 per cent is charged by the banks will be reimubursed by the government.

A sub-committee was appointed to represent the equipment companies at Washington in connection with the issuance of the certificates, consisting of George Shaw, Standard Steel Car Company; H. W. Wolf, American Car & Foundry Company; L. O. Cameron, Pressed Steel Car Company, and F. O. Riener, Haskell Barker Car Company. Companies having contracts with the builders were requested to telegraph their bills as of April 1 to J. M. Hansen, secretary of the car and locomotive manufacturing committee, at Washington.

The form of certificate issued to the equipment companies is practically the same as that issued to the railroads, and certifies that the director general is indebted for the amounts "due and payable for motive power, cars and other necessary equipment or parts thereof, or materials and supplies therefor, furnished to the director general for use on or in connection with the property of carriers under federal control . . . which sum the director general hereby promises to pay to or upon the order of the corporation . . . whenever and as soon as the director general shall have funds available for the payment of this certificate and of all other like certificates issued by the director general and then outstanding, whether received by appropriation of the Congress or by virtue of moneys arising out of the use and operation of the railroads . . . or otherwise."

Fifty-eight Contracts Executed

Contracts with railroad companies which cover more than half of the standard return to be paid by the government as rental for the use of railroad properties had been executed up to April 5. A total of 58 contracts had been signed for a total of $524,290,351. Although the number would indicate only a small portion of the number of railroads involved, the contracts in most instances cover a large number of subsidiary companies, some of which are themselves Class I railroads.

In addition to those previously mentioned, contracts have been executed with the Chicago, Milwaukee & St. Paul, providing for $27,946,771, and also with the Alabama, Tennessee & Gulf; Delaware & Northern; Rome & Northern; Tennessee Railroad; New Orleans, Natalbany & Natchez; and the Atlanta Northern.

Payments to Railroad Companies

The total payments to the railroad companies on account of compensation and loans which can be regarded substantially as payments on account of compensation during the 15 months of federal control ended March 31 aggregated $494,478,265, according to a statement authorized by Director General Hines, explaining the cash receipts and disbursements by the Railroad Administration treasurer at Washington. The total amount loaned the railroad companies by the director general for the 15 months was $231,911,459 and of this amount $61,356,000 has been repaid. The statement explains that all of the balance, practically speaking, can be deducted in settlement of the compensation so that these items, while termed loans, can be regarded substantially as payments on account of compensation. The total standard return for all roads is approximately $928,000,000 and for the Class I railroads, whose statistics are the ones usually used, the standard return is approximately $890,000,000. The usual statement of the cash transactions of the Railroad Administration for the month of February was not issued, but a statement in a new form was given out on April 5 for the month of March and in some instances for the 15-month period. According to this statement the cash receipts from all sources, including payments on account of transportation furnished the War and Navy departments, loans by the War Finance Corporation, repayments of loans by the railroad companies, amounts transferred from railroad treasuries, and collections from express companies, aggregated $176,973,719.

Cash disbursements, including payments to railroad companies on compensation, and on account of loans, advances to federal treasurers, payments to waterways and canals, and for standardized equipment, amounted to $98,487,977.

Of the foregoing amount, $78,142,925 represented payments to federal treasuries for current requirements, and these are still being further supplemented.

The total payments for standardized equipment during the 15-month period amounted to $163,950,402.

The above relates to the cash receipts and disbursements of the central administration, and does not include the receipts and disbursements of the federal treasurers in connection with the operation of the properties under federal control, as these figures are not yet available.

Plans for Agricultural Development

More than 100 heads of agricultural development of railroads under federal control held a conference in Memphis, Tenn., April 2, 3 and 4 for an exchange of views regarding methods of obtaining the best results and to make plans for their activities during the reconstruction period. The program adopted includes four general propositions, as follows:

1—To collect the latest information about opportunities for farming, stock-raising, dairying, fruit-growing, etc., in the several states having undeveloped resources, and furnish it free to those who wish to engage in such pursuits, special attention to be given to discharged soldiers and sailors.

2—To co-operate with county farm agents and other government and state authorities in looking after the interests of newcomers through the dissemination of information regarding methods of soil preparation, seeding, cultivation, etc., in order that they may be successful in the localities in which they have settled.

3—To improve marketing conditions by the widest circulation of information about where and when farm products will be ready for sale and where and when there will be need of such products, thus enabling the farmer to send his stuff to markets which are not glutted, and to obtain for it a price that will mean a profit on his investment, rather than a loss.

4—To conduct a campaign in co-operation with government and state authorities with the view of increasing the live-stock output, not only because it is a profitable feature of the farming business, but also for the purpose of building up the soil.

J. L. Edwards of Washington, manager of the Agricultural Section, who called the Memphis conference, expects much good to come of the marketing feature of the program.

According to Mr. Edwards' report for the first three months of 1919, approximately 12,000 homeseekers have written to

FREIGHT TRAFFIC MOVEMENT AND CAR PERFORMANCE, FEBRUARY, 1919, COMPARED WITH SAME MONTH OF PREVIOUS YEAR

	Average miles of road operated		Net ton miles revenue and non-revenue (thousands)			Net ton miles per mile of road per day		Train miles (thousands)		
	This year	Last year	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change
Total, New England District	8,116	8,143	692,761	719,232	d 3.7	3,048	3,155	1,519	1,949	d 22.1
Total, Central District	22,389	22,474	4,401,857	5,093,986	d 13.6	7,022	8,095	6,019	6,837	d 12.0
Total, Ohio-Indiana District	6,847	6,829	810,431	1,209,525	d 33.0	4,227	6,326	1,150	1,618	d 28.9
Grand total, Eastern Region	37,352	37,446	5,905,049	7,022,743	d 15.9	5,646	6,698	8,688	10,404	d 16.5
Total, Allegheny Region	19,751	19,682	4,779,874	4,991,879	d 4.3	8,643	9,058	6,358	7,044	d 9.7
Total, Pocahontas Region	5,065	5,059	1,475,076	1,986,427	d 25.7	10,401	14,023	1,360	1,776	d 23.4
Total, Southern Region	37,318	37,422	3,448,985	3,969,462	d 13.1	3,301	3,788	6,552	7,856	d 16.6
Total, Northwestern Region	47,179	47,200	3,337,303	3,796,760	d 12.1	2,527	2,807	5,754	6,898	d 16.6
Total, Central Western Region	51,143	51,233	4,730,753	5,442,287	d 13.1	3,304	3,794	7,918	9,178	d 13.7
Total, Southwestern Region	31,396	31,709	2,004,903	2,468,702	d 18.8	2,281	2,780	4,227	4,897	d 13.7
Grand total, all regions	229,204	229,751	25,681,943	29,678,260	d 13.5	4,002	4,591	40,857	48,053	d 15.0

	Net ton miles per train mile			Freight car miles (thousands)								
				Loaded			Empty			Total		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District	456	369	23.6	29,626	31,022	d 4.5	12,532	11,507	8.9	42,158	42,529	d 0.9
Total, Central District	731	745	d 1.9	165,135	176,281	d 6.3	89,185	72,371	23.2	254,320	248,652	2.3
Total, Ohio-Indiana District	705	748	d 5.7	27,808	38,108	d 27.0	13,908	16,436	d 15.4	41,716	54,544	d 23.5
Grand total, Eastern Region	680	675	0.7	222,569	245,411	d 9.3	115,625	100,314	15.3	338,194	345,725	d 2.2
Total, Allegheny Region	752	709	6.1	143,940	147,503	d 2.4	88,664	80,200	10.6	232,604	227,703	2.2
Total, Pocahontas Region	1,085	1,118	d 3.0	37,316	47,835	d 22.0	22,547	31,801	d 29.1	59,863	79,636	d 24.8
Total, Southern Region	526	505	4.2	133,691	154,917	d 13.7	57,408	60,143	d 4.5	191,099	215,060	d 11.1
Total, Northwestern Region	580	550	5.5	127,065	149,627	d 15.1	50,525	44,033	14.7	177,590	193,660	d 8.3
Total, Central Western Region	597	593	0.7	179,702	200,045	d 10.2	77,663	76,866	1.0	257,365	276,911	d 7.1
Total, Southwestern Region	474	504	d 6.0	82,075	98,792	d 16.9	34,137	33,996	0.4	116,212	132,788	d 12.5
Grand total, all regions	629	618	1.8	926,358	1,044,130	d 11.3	446,569	427,353	4.5	1,372,927	1,471,483	d 6.7

	Average number of freight cars on line daily							Net ton miles per loaded car mile		
	Serviceable		Total			P. ct. unserviceable				
	This year	Last year	This year	Last year	Per cent change	This year	Last year	This year	Last year	Per cent change
Total, New England District	89,574	105,781	94,610	110,855	d 14.7	5.3	4.6	23.4	23.2	0.9
Total, Central District	381,862	480,170	406,675	505,294	d 19.5	6.1	5.0	26.7	28.9	d 7.6
Total, Ohio-Indiana District	77,880	90,502	82,472	96,527	d 14.6	5.6	6.2	29.1	31.7	d 8.2
Grand total, Eastern Region	549,316	676,453	583,757	712,676	d 18.1	5.9	5.1	26.5	28.6	d 7.3
Total, Allegheny Region	437,208	464,297	469,556	496,816	d 5.5	6.9	6.5	33.2	33.8	d 1.8
Total, Pocahontas Region	92,700	80,600	97,654	85,009	14.9	5.1	5.2	39.9	41.5	d 4.8
Total, Southern Region	300,308	291,737	315,168	303,616	3.8	4.7	3.9	25.8	25.6	0.8
Total, Northwestern Region	349,371	275,511	371,925	293,789	26.6	6.1	6.2	26.3	25.4	3.5
Total, Central Western Region	342,663	311,332	361,062	327,275	10.3	5.1	4.9	26.3	27.2	d 3.3
Total, Southwestern Region	212,401	202,553	219,752	211,082	4.1	3.3	4.0	24.4	25.0	d 2.4
Grand total, all regions	2,283,967	2,302,483	2,418,874	2,430,263	d 0.5	5.6	5.3	27.7	28.4	d 2.5

	Per cent loaded to total car miles			Car miles per car day			Net ton miles per car day		
	This year	Last year	Per cent change	This year	Last year	Per cent change	This year	Last year	Per cent change
Total, New England District	70.3	72.9	d 3.6	15.9	13.7	16.1	262	232	12.9
Total, Central District	64.9	70.9	d 8.5	22.3	17.6	26.7	387	360	7.5
Total, Ohio-Indiana District	66.7	69.9	d 4.6	18.1	20.2	d 10.4	351	448	d 21.7
Grand total, Eastern Region	65.8	71.0	d 7.3	20.7	17.3	19.7	361	352	2.6
Total, Allegheny Region	61.9	64.8	d 4.5	17.7	16.4	7.9	364	359	1.4
Total, Pocahontas Region	62.3	60.1	3.7	21.9	33.5	d 34.6	539	835	d 35.4
Total, Southern Region	70.0	72.0	d 2.8	21.7	25.3	d 14.2	391	467	d 16.3
Total, Northwestern Region	71.6	77.3	d 7.4	17.1	23.0	d 25.7	320	451	d 29.0
Total, Central Western Region	69.8	72.2	d 3.3	25.5	30.2	d 15.6	468	594	d 21.2
Total, Southwestern Region	70.6	74.4	d 5.1	18.9	22.5	d 16.0	326	418	d 22.0
Grand total, all regions	67.5	71.0	d 4.9	20.3	21.6	d 6.0	379	435	d 12.9

him, asking about farm opportunities in various states. These inquiries are answered by the Homeseekers' Bureau, which is an organization of agricultural representatives of federal controlled railroads working as state committees under Mr. Edwards' supervision. The state committees are prepared to give homeseekers the specific information they want. About 15 per cent of the inquiries are from discharged soldiers and sailors. The Memphis conference adopted a resolution urging Congress to assist soldiers and sailors to obtain farms on easy terms of payment.

Modification of Shipping Day Plan Agreed On

At a conference held under the direction of Max Thelen, director of the Division of Public Service, of representatives of the railroads, the shippers and the state commissions, at Washington this week, an agreement was reached on a modification of the "shipping day" plan for handling less than carload merchandise, which removes many of the objections made by shippers while still preserving the principle and advantages of the plan. The shippers, represented by a committee of the National Industrial Traffic League, and a committee of state commissioners, agreed to support the principle of the plan and to co-operate to make it a success. The shipper is given the right to deliver his freight to the carrier on any day, but the railroads may continue the plan of "staggered service" by agreement. The railroads were represented by the chairman of the sailing day committees for each region and by Fred Zimmerman, representing the Division of Traffic, and F. M. Lucore, representing the Division of Operation. The plan as drawn up by a subcommittee representing the various interests and approved is as follows:

1. The shipper shall not be deprived of his right to route his freight over any line at the legal rates applicable and to deliver his freight at point of origin to such carrier on any business day during regular business hours.

Except as to freight specifically routed by shipper preferred routes should be established based on the following considerations:

(a) Convenience to shippers and consignees.
(b) Economy and expedition of movement.
(c) Proper recognition of non-federal controlled roads.

2. Daily service will be given to the greatest possible extent.

At shipping points where it can be mutually arranged by representatives of the shipping public and the carriers, schedules will be published covering the movement of L.C.L. freight, tendered at freight houses, to be forwarded in through cars or set-out cars on specified days.

The specified days shall be known as "Shipping Days."

3. Peddler cars shall be operated daily, except where more limited service is agreed upon between shippers and carriers or authorized by lawfully constituted regulating authorities, and schedules shall show peddler car service maintained from shipping points.

4. It is earnestly recommended by the committee that in order to secure improved service for the shipping and receiving public and to make possible economical and efficient operation by the carriers, the fullest co-operation should be observed in carrying out the principles agreed to herein, and the committee pledges itself to this end.

Two thousand employees of the Pere Marquette and the Grand Rapids & Indiana attended a safety rally at Grand Rapids, Mich., on April 3. N. Ferris, ex-governor of Michigan; Frank H. Alfred, federal manager of the Pere Marquette and associated lines; R. C. Richards, chairman of the central safety committee of the Chicago & North Western, and George Bradshaw, supervisor of safety of the Pere Marquette, addressed the employees.

Orders of Regional Directors

GUESSING AT WEIGHTS.—A. H. Smith, regional director, Eastern Region, in a circular to Federal managers, calls attention to the importance of showing the gross weight of car and contents on every running slip, for the purpose of calculating the gross weight of trains, and adjusting this weight to the capacities of locomotives. In the absence of the figures, the yardmaster must guess at the weight. A recent examination of a large number of running slips on one of the Eastern railroads showed that approximately 75 per cent of the bills on hand in yard offices failed to show the weight in the space provided on the bill.

Fire Protection.—Circular 198 of the Southwestern regional director calls for the burying of gasoline storage tanks outside of tool houses or other structures because of frequent losses sustained by fire.

Light Weighing of Freight Cars.—Order 187 of the Southwestern regional director similar to an order issued by the Central Western regional director (*Railway Age,* April 4, page 898).

Embargoes.—Circular 248 of the Central Western regional director similar to Circular 75 of the Northwestern regional director (*Railway Age,* April 4, page 898).

National Travelers' Aid Society.—The Northwestern regional director, file 8-1-52, promulgates rules for the cooperation of employees on roads in this region with representatives of the National Travelers' Aid Society. Permission is extended to representatives of this society for desk room in terminals, to put up properly worded signs advising of their presence, to use the station facilities and to place notices in time table folders. No extension to present telegraph service between workers at various points will be authorized.

Grain Embargo—Primary Market.—Circular 197 canceling Circular 96 and all supplements thereto of the Southwestern regional director states that the embargo placed against the movement of grain to primary markets has been entirely lifted. It is now permissible to ship all grains to primary markets without grain control committees' permits.

Automobile Cars.—Order 191 canceling Order 184 of the Southwestern regional director similar to Circular 430 of the Southern regional director (*Railway Age,* March 28, page 834).

Embargo Regulations.—Order 189 of the Southwestern regional director similar to Circular 75 of the Northwestern regional director (*Railway Age,* April 4, page 898).

Bill of Lading Form.—Supplement 7 to Circular 6 of the Northwestern regional director similar to Circular 127 of the regional director of the Allegheny region (*Railway Age* of April 4, page 898).

April Estimates.—A. H. Smith, regional director, Eastern Region, has called on federal managers for an estimate of earnings for April; estimate of operating ratio; of number of men employed, of the number of man hours, and an estimate of the total payroll for each department; all to be shown compared with the actual figures obtained for the month of April, 1918.

Per Diem Allowances to Short Line Railroads.—Circular 78 of the Northwestern regional director states that the per diem allowance of two days free time under the standard contract with short line railroads will only apply when a contract has been executed between the short line and the Railroad Administration. When this is done the free time allowance will apply retroactively to April 1, 1918, and The Car Service Section will instruct the assigned federal railroads to make prompt settlement. Such allowances are in lieu of reclaims already made or provided for in the local agreements.

Specifications for Cross Ties.—Supplement 17 to North-

western Regional Purchasing Committee Circular 19 contains diagrams of those types of ties which are acceptable under the Standard U. S. R. R. Administration specifications as well as some that should be rejected.

Public Health Placards.—The regional director, Eastern Region, by order No. 1600-38A665, authorizes compliance with requests from the Bureau of Public Health Service, Treasury Department, and from State Boards of Health, for permission to post placards listing the locations and hours of treatment of the free government and state clinics for venereal diseases. These notices are to be worded substantially as prescribed by the Division of Operation and are to be not larger than 6 in. x 10 in. in size. They are to be posted only in men's toilets at stations and not, under any circumstances in men's waiting rooms or in cars.

Errors in Interchange Reports.—The regional director, Eastern Region, by circular 2000-19-43A661, calls attention to the large number of errors found in interchange reports, vitiating the accuracy of car records. The Car Service Section requests that interchange points, especially at large industrial centers, be carefully supervised and a report rendered monthly of errors in interchange reports. A form is given showing the number of errors of different kinds and the percentage of erroneous entries. One or more traveling men must be assigned to properly police interchange points, and these traveling men will meet at interchange points for the purpose of making joint analyses and application of remedies. Each road will make its report to the Car Service Section on or before the close of each month, and also distribute same information to such local agents as may be necessary.

Separation of Accounts between Federal and Corporate Interests.—The regional director, Eastern Region, by circular 700-26A664, promulgates a letter from C. A. Prouty, director, Division of Accounting, requesting that each federal manager of a Class 1 road delegate one or more experienced accountants to the work of inspecting the separation of the accounts between federal and corporate interests as of December 31, 1917; the period of service being estimated at about six months and the men to return to their positions at the end of such service. Each railroad is to continue to carry its employees so designated upon its payroll and pay their expenses while engaged in this special work.

This order contemplates the establishment of a temporary accounting organization at Washington, and a competent accounting force cannot be secured from sources other than the railroad accounting departments. The men to be detailed to this work must be above the ordinary clerical grade, one, at least, of whom must have had some experience in the general accounting features in the separation of accounts as well as the lap-over features. Men having experience in disbursements and freight accounts may act as assistants. In the event that any of the men detailed for this work are not properly qualified therefor, they will be returned to the office of the federal auditor who assigned them, and more experienced men called for.

These accountants will be required to take service upon any line determined upon by Director Prouty. In the event that the Accounting Department of one railroad falls behind in its work, because of this temporary assignment of men to this work, it is proposed to assign some of the force of other lines in the same region to the office of the line which has fallen behind.

Employees killed and injured on the New York Central in the twelve months ending with December, 1918, totaled fewer than in 1917; five less killed and 1,154 less injured. This improvement was made notwithstanding that conditions in 1918 were very unfavorable throughout the year; a large increase in traffic and many inexperienced employees.

The Ticket Agent as a Salesman*

By George A. Cullen

General Passenger Agent, Delaware, Lackawanna & Western

IN A MUCH LARGER DEGREE than is generally realized, the man behind the ticket counter (and only to a less extent behind the ticket window) serves in three capacities which rank him high as a salesman in the best sense of that word.

First: He is a creator of business. It is universally recognized that a very considerable proportion of railroad travel is what may be expressed as volatile, or better yet, as vaporous in the sense that it is not tangible and may become entirely dissipated unless condensed by the actual purchase of a ticket. The volatile traveler is one, for example, who has a vacation ahead of him which he may spend in his automobile or by a railroad trip to Atlantic City, yielding the railroads $7 revenue, or by a trip to Glacier National Park, for which the railroad fare is $150. The vaporous individual is one who needs a rest from his business, but who does not know where to go if he should take a vacation and so is likely to remain at his desk, let his health run down and instead of contributing $300 or so to help the director general overcome the deficit by buying a ticket to California, compels his heirs to spend a like amount with the undertaker to convey his remains to Woodlawn.

Now, let either of these men go to a ticket office and fall into the hands of a listless and inattentive ticket seller of the vendor class and the potentialities of the situation remain entirely undeveloped. Let him, however, approach a real live transportation salesman and note the difference. He is immediately shown the attractions of this or that resort, the excellent facilities for getting there, the Pullman accommodations, the ease with which his baggage will be handled from home to hotel, etc. Just the right literature is placed in his hands so that he can talk it over with his wife, the agent's personal card is handed him, and a cordial invitation is given him to return and buy his ticket, and, lo, the seed is sown that will bear golden fruit in railroad dividends.

Second: Important as is the feature just mentioned, I do not know but that even more so is the element of salesmanship which a ticket man possesses as a creator of good will. There is no one spot at which the traveling public comes into contact with the personnel of the railroad so intimately as at the ticket counter or windows. Here it is that a soft answer may turn away wrath. Here the perplexities of the aged and the ignorance of the young may alike be relieved. Here the busy man of affairs may get his ticket to Chicago and his "choice upper berth near the wash room" at the same time that he gets his impression of the great courtesy and real interest in endeavoring to furnish him a drawing-room which the tactful agent has displayed and consequently go on his way with a determination to vote for whoever at the time, administration or corporation, is running the roads.

Third: He is a creator of service. Every business house in these enlightened days looks to its selling organization not only to induce the public to purchase the goods it has manufactured, but to keep its finger on the public pulse to ascertain what the public demands and is willing to buy if the house will only manufacture it. Here the ticket agent is and can in increasing measure be of vital service to the railroad management. He listens every hour of the day to the comments of the public and should be encouraged to analyze those comments and report them to his higher officers. The intelligent and progressive managements have so encouraged him in the past, and when this practice has pre-

*From an address at the Railroad Ticket Agents' dinner, Hotel Astor, New York, March 29, 1919.

vailed the men have shown a high intelligence in discriminating between the idle suggestions of the habitually dissatisfied and the genuinely helpful comments of the sober minded and reasonable among the traveling public. Reports of ticket salesmen on business lost on account of inconvenient hours of trains, on infrequency of service, improper equipment, absence of necessary Pullman accommodations, etc., are the best guide a railroad management can have as to how to develop passenger traffic.

Railroad Construction in Spite of Snow, Glaciers, Floods and Forest Fires

RAILROAD CONSTRUCTION and operation in Alaska have been impeded by extraordinarily adverse weather conditions during the past year. Some idea of the difficulties encountered is conveyed by a recent report from the Seward division and an annual report by William Gerig, engineer in charge of construction work on the Anchorage division.

Ice on the track of the Seward division between Mile 57 and Mile 68 interfered with the operation of the trains during the week ended December 7, states the Alaska Railroad Record of December 10. Warm weather, accompanied by rain, early in that week caused a flow of water over the flats between Mile 57 and Mile 68, and then a sudden change to cold weather left about an inch of ice on the rails. Trains could not run until the ice had been picked away by hand labor, as no machinery was available to remove it.

A train which left Anchorage for Seward on Saturday, December 7, with 82 passengers reached Mile 58 on the night of that day, and being unable to proceed farther over the iced rails returned to Kern Creek, Mile 71, where there were roadhouse accommodations for the passengers. In returning to Kern Creek, the train experienced a difficult trip, for since the cars had run over the rails from that point to Mile 58 the track had glaciered again. Leaving Kern on the forenoon of the following day, the train reached Mile 54 late Sunday night, December 8, where the passengers and their baggage were transferred around a 1,200-ft. snow slide and then entered another train that got them into Seward at seven o'clock Monday morning. Gangs of laborers, with the temperature at 12 deg. below zero and a strong wind blowing, worked continuously in relays on Saturday, Saturday night, Sunday and Sunday night picking the ice ahead of the trains.

The glaciered route between Mile 57 and Mile 68 is low and flat. In the opinion of government railroad officials, the most feasible method of preventing ice blockades is to raise the tracks four or five feet. This improvement, of course, cannot be made this winter.

In a report on the construction work on the Anchorage division, William Gerig, engineer in charge for the Alaskan Engineering Commission, states that the winter of 1917-1918 was the coldest and longest experienced since the beginning of work on that part of the Alaskan line. Cold weather, he says, set in during the latter part of October, 1917, and continued until late in May, 1918. Considerable snow fell in the Turnagain Arm district, causing many snow slides on the south end of the district. This created such a dangerous situation that it was necessary to suspend all grading during the month of March. It was not until the last week in April that the danger was past and that the men returned to work.

Thawing weather late in April caused mud slides and soft tracks. Track forces were increased for maintenance work, but as the ground was still frozen, permanent repairs could not be made. During May the ground had thawed sufficiently in the Turnagain Arm and Matanuska districts so that forces were increased and permanent repairs to track were made. When the weather did moderate the temperature rose rapidly, causing floods in the Matanuska and other rivers. As these glacial streams change their channels rapidly during floods, it became necessary to do an excessive amount of riprapping, which ordinarily would have been done with the maintenance forces. On the branch to Chickaloon some ten miles of track was protected by placing riprap, and a steam shovel with two trains was employed here during two months. The thawing weather came at the same time as the maximum high tides and two pile trestles on Turnagain Arm were badly damaged by ice frozen to the piles which lifted them.

From Houston northward in the Talkeetna district, the roads were practically impassable during the month of May on account of the depth of snow during the earlier part of the month and subsequently on account of heavy rains and thaw, which made them very muddy. Throughout nearly the entire month the Susitna river was frozen over and ice did not commence breaking up until May 26. It formed gorges and floods and did damage to both roadbed and supplies.

There was a big flood in the Knik river, extending over a period of three weeks, which required constant patrolling by a large force in order to prevent damage to railroad bed and bridges. Little damage was done outside the loss of some 8,000 ties which had been stored on ground supposed to be above high water. During July and August, there was little rain and consequently many forest fires occurred. One very destructive fire at Mile 83 destroyed a construction camp and supplies valued at about $40,000, but fortunately no lives were lost. In September at highest tide, a wind storm damaged the road bed between Mile 83 and Mile 88.

On the southern end of the division favorable working conditions extended over a period of five months and on the Talkeetna district about four months. Labor of all kinds were short on account of the war, as many men volunteered and others were drafted and no outside labor was brought in. Rails which should have been delivered in June and July, were not received until August and September, and consequently track laying was considerably delayed. Lumber and material for bridge construction were also delayed owing to the conditions in Seattle and to the scarcity of vessels. There were several periods when no vessels arrived for three weeks.

The Trainmen's Wage Increase

A GENERAL ORDER allowing further increases in wages to the train service employees, as a revision of General Order 27, for the purpose of restoring to some extent the former relationship between the wages of train employees and other classes, is expected to be issued by Director General Hines shortly, to be retroactive to January 1.

The order was practically completed several days ago but has been somewhat modified following conferences between the director general and his staff and the executive officers of the brotherhoods, who have been in Washington since Monday. It is understood that one of the results of the conferences has been to refer back to the Board of Wages and Working Conditions the question of time and one-half for overtime, and other matters relating to rules and arbitraries, also that in order to secure satisfactory revisions of the compensated wage schedule the brotherhoods consent to waive the saving clause they have always insisted upon in arbitration agreements, and that they have surrendered some rates or rules in return for general increases.

Train employees were included in the general advances which were ordered last May, but action on their request for a revision was postponed until after some other classes of employees had been dealt with. The new order practically completes the 1918 cycle of wage increases.

An Important Development in the Railways of Spain

With an Account of a Project for a Proposed New Trunk Line from France to the Straits of Gibraltar

By F. Lavis

IN THREE PARTS—PART III.—THE PROPOSED LINE

MADRID is now connected with France and the rest of Europe by two lines of railway, which cross the northern frontier at its extreme ends, at Irun (France-Hendaye) on the west and at Port Bou on the east. Between these lies the main range of the Pyrenees Mountains which forms a formidable barrier as well as the boundary between France and Spain.

Port Bou is the gateway into France from Barcelona, and would naturally be used from Madrid only for traffic to the south of France and Italy. From Madrid, Paris is now reached via the line of the "Norte" railroad through Irun.

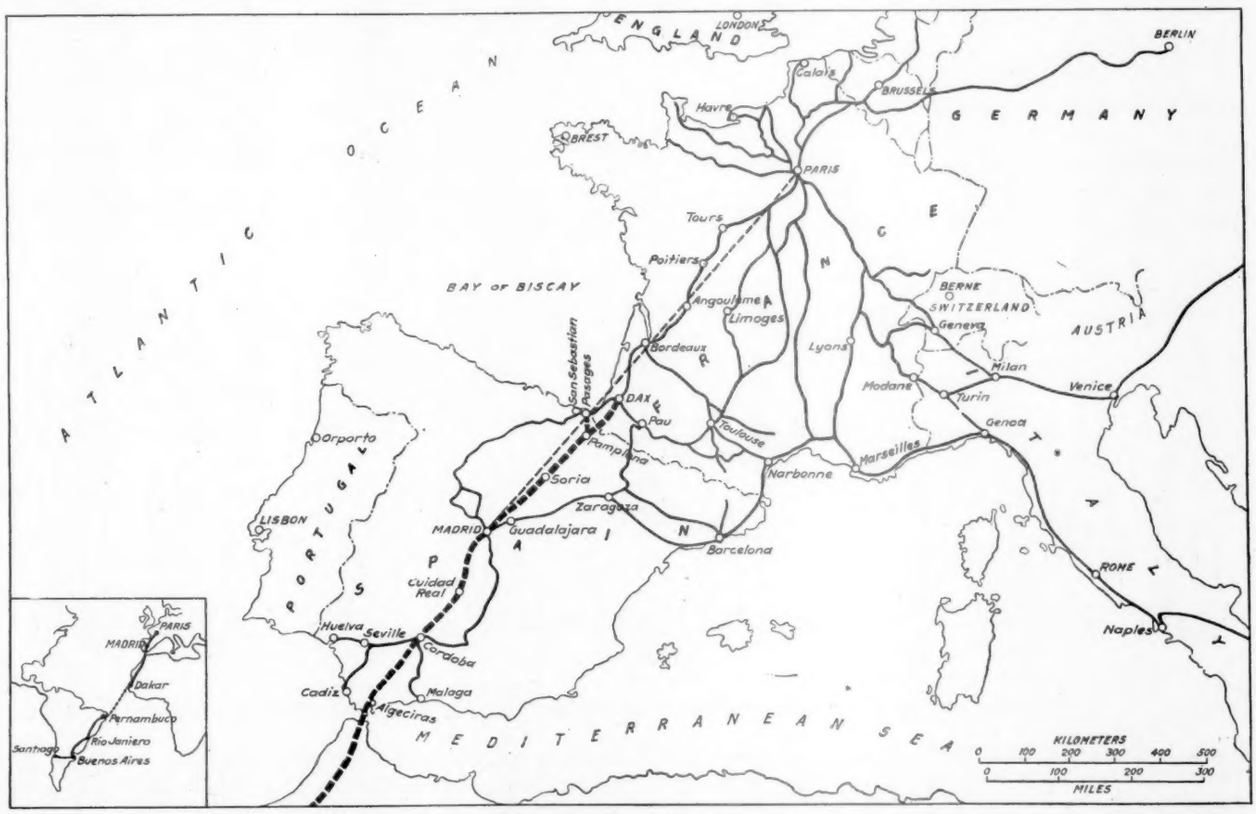


Fig. 16.—The Proposed Direct Line Through Madrid and Its Relation to the Other Railways of Europe and, as Shown in the Insert, to Those of South America

This line, as will be seen by the map in Fig. 16 first runs westerly from Madrid for nearly 125 miles to Medina del Campo, crossing the Guadarrama mountains, then follows the plains of Old Castile northerly through Valladolid, Burgos, etc., to the Cantabrian mountains, which are crossed to reach San Sebastian and Irun on the Bay of Biscay. This line is 628 kilometres (389 miles), in length and follows a very roundabout route.

For many years (since as long ago as 1853) various attempts have been made to build a more direct line, and studies of this project and variations of it were made several years ago by American engineers, among others, P. W. Henry and John F. Stevens, but for various reasons nothing further was actually done. Interest in the project was, however, revived a few years ago by King Alphonso, and a government commission to study the project was appointed in 1914, which made a report a year or so later recommending a line running through Soria and Pamplona which would connect with the French railways at Dax (Fig. 3, Part I, *Railway Age* of March 28, page 826.

The instructions to this commission were such that they felt they were limited in many ways, and the project set forth in their final plans was for a double track line of first class construction, equipped for electric traction, which involved a cost of approximately $257,000 per mile, as shown in detail in the following table:

	Per kilometre, pesetas	Per mile, dollars
Structures and stations	536,652	173,113
Track	127,742	41,206
Rolling stock	55,139	17,785
	719,533	232,104
Electrification of line	49,666	16,020
Development of power	29,030	9,364
	797,229	257,488

The General Council of Public Works and the responsible heads of the government, thought that this large expenditure was hardly warranted by the expected traffic or by the political benefits which might be derived from the construction of the line, but in the spring of 1918 the matter was brought to the attention of the American International Corporation and the writer was requested to make a detailed study of the whole project. It was thought that perhaps, not being hampered by limiting instructions, a less costly line might be found, which would still fill the requirements for a through line for fast express service, and it was felt that the more general application by American railway engineers of economic principles to problems of this kind, and their better knowledge of the relation between cost of construction and cost of operation, might be of value.

As a result of these investigations a route was selected, the cost of which was expected to be much less than that given above, and which compared very favorably with that of the existing railway, as shown by the following table and the comparative profiles, Fig. 17.

Comparison of Physical Characteristics F. C. del Norte and the Direct Line, Madrid to the French Frontier

	Existing Railway Norte	Direct line: Spanish Commission	Direct line: Survey of 1917
Length Kms.	641	443	427
Rise and fall meters	1,620	2,221	2,018
Curvature degrees metric*	17,680	16,931	13,271

*20 meter chords.

Other Proposed Routes

There have been several proposals for the construction of other connections between the railways of Spain and those of France; and a few years ago a Trans-Pyrenean railway commission was organized in Spain to construct three lines, across the border, which had been agreed upon by the governments of the two countries, which are the following: (See also Fig. 3.)

Barcelona-Toulouse via Puigcerda and the valleys of the Llobregat and Ariege.

From Lerida via the valley of the Noguera Pallaresa.

From Zaragoza via Jaca and Canfranc.

The last is nearly completed and should be opened for traffic within the next year or two. By reason of its heavy gradients, rise and fall, alignment, etc., it probably will not carry much through traffic. No work has been done on the second of these lines but some progress has been made on the Pyrenees section of the first, the summit tunnel having recently been completed. There seems to be some justification for this line as Barcelona is the largest and commercially the most important city in Spain and the proposed line will afford direct communication between Barcelona and Toulouse, and through this latter city, direct to Paris and all parts of France. The work, however, is said to be very heavy and the gradients and alinement rather bad. The need for the second line is not very apparent and the construction, it is said, will be very difficult.

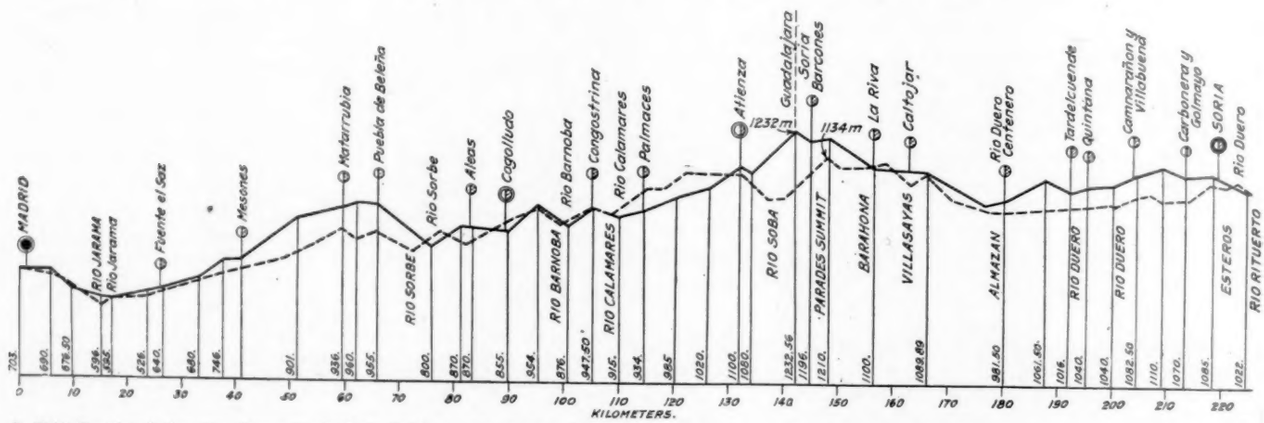
Through Route to Africa

As already noted, the proposed "Direct" line, if built, besides furnishing more direct communication between Madrid and Paris, may eventually form part of a through transcontinental route from western Europe to Africa and South America.

The report of the original commission discussed at considerable length the question not only of the desirability, but also the need of a direct line of railway from north to south through Spain, as a means of easy sure communication between the countries of western Europe and the northwestern part of Africa.

Sr. Echarte, the chief engineer, in his report, referred to the long discussed plan of a railway from Paris and, incidentally, of course, from Germany, Holland, Belgium, etc., through Spain and northwestern Africa to Dakar and thence by a short ocean trip to Pernambuco in Brazil. That such a route is an inevitable development of the future, seems almost sure, and the experience of the great war is likely to create a tremendous impulse in the development of transportation facilities everywhere, especially in Spain, so that its realization may not be so far in the future as may seem at first thought to be likely and considering the matter solely from a purely commercial standpoint.

The development of this through route as a whole is, however, probably too large a plan and too far ahead of the needs of Spain or the world to be undertaken just now, but it is mentioned in passing as an incidental though not unimportant feature of the project under consideration.



It Will Be Noted that the Names in Capitals Relate to the Broken Line and Those in Lower Case Letters to the Full Line

Fig. 17. Profile of the Proposed Direct Line from Madrid to the French Frontier. Showing in the Full

The "Direct" Line

A straight line drawn from Madrid to Paris (see Fig 16), will pass close to the western end of the frontier and near the city of Pamplona, the capital of the province (and former kingdom) of Navarre. This is the only important city in this section of Spain, except San Sebastian on the coast, and every indication points to it as a controlling point on any proposed direct line between Madrid and Paris, unless topographical conditions interfere.

In some respects the Pyrenees form the most important topographical feature in the consideration of a through route between Madrid and Paris. Given the fact that it is desired to cross near their western end, the pass of Urtiaga, just north

of Pamplona, and reached on the Spanish side by the valley of the Arga and on the French side by that of the Alduides, is the most easily accessible. There are two passes to the east, those of Roncesvalles and the valley of the Roncal, and one to the west, the pass of Otsunda, but for reasons which are discussed in detail in the report, Pamplona and the Urtiaga pass are shown to be the controlling objective points at the northern end. The problem, therefore, was the location of a line between Madrid and these points.

Methods of Investigation

The object of the investigation was to determine, without going into too much detail, the best route, between Madrid and the French frontier, adapted for fast passenger traffic, and whether such a line could be obtained at a reasonable cost compared with the traffic to be expected and in view of the political advantages and other controlling circumstances.

The writer had the advantage of the surveys of the original commission and of the advice of Sr. Gonzales Echarte, the former chief engineer. It was decided to make a stadia reconnaissance of such variations of the original route as might seem to be desirable or necessary, and the writer took with him to Spain three assistants: W. L. Gibson, F. O. Pease and H. A. Ayres, all of whom had had considerable experience in railway location and construction in South and Central America as well as in the United States. The party left New York on July 18, 1917, and arrived in Madrid on August 1. The field work was completed early in December and the office work by the last of the year, the party reaching New York again a little more than six months after sailing.

Preliminary investigations of the territory were immediately commenced on arrival in Madrid, and as soon as possible after complying with the necessary formalities, three field parties were organized, with Mr. Gibson in general charge, and Messrs. Pease, Ayres and Lacroix (the latter a Frenchman resident in Spain), each in charge of a party of five Spanish assistant engineers and the necessary peons, all obtained in the country. An office with necessary draftsmen and assistants was established in Madrid for the compilation of the necessary maps and data.

Stadia lines were run over the route selected, which involved an entirely new line for some 345 kms. (215 miles) from Madrid north. The topography obtained was platted on a scale of 1:4000 (about 333 feet to the inch), and a line projected on this map, from which the quantities of earthwork, bridging, etc., were calculated.

This study, while developing the main controlling features of the route and a close approximation of the final location, was, of course, far from detailed enough or sufficiently thorough to permit the assurance that absolutely the best line had been obtained. The estimates of quantities and cost, however, are believed to show within reasonable limits the approximate cost of building a line through this territory, and although further studies will undoubtedly show the desirability of modification of details, some of which may lessen the cost, and others possibly improve the alinement or gradients, at a somewhat increased cost of construction, on the whole this should not change materially the general aspect of the situation.

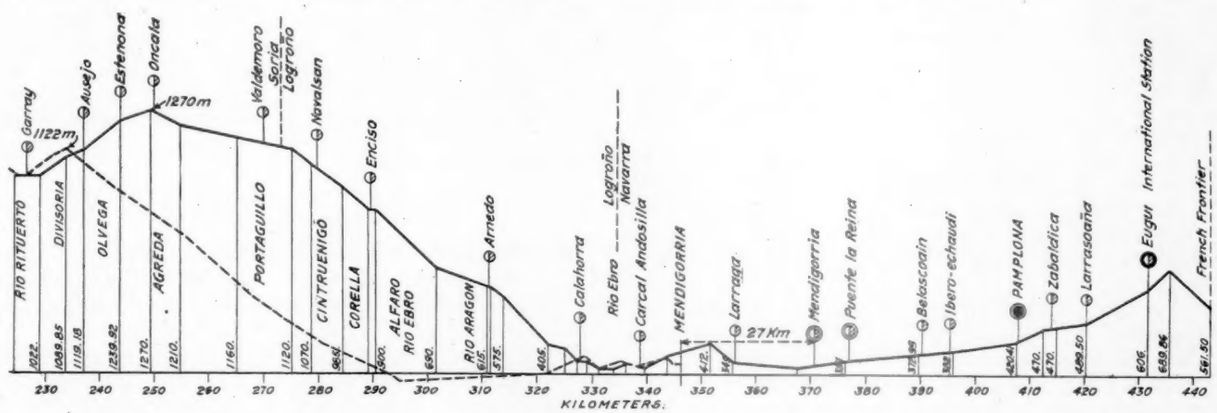
Both the writer and his assistants have all been accustomed to work in Spanish-speaking countries and in South and Central America, but found in Spain many differences, due principally to the more strongly established customs of the older European country, which were generally less susceptible of modification than those of the newer countries of North and South America. This is mentioned, not only because it involved some little delay from time to time and modifications of the plans for the prosecution of the work, but it is important to keep in mind in connection with any enterprise which may be undertaken in the future in Spain. It will be quite feasible, under proper management, to introduce some American ideas, but there are many which will either not be admitted at all, or only after considerable modification.

Location and Design

The primary object of the line is to obtain fast, convenient passenger service between Madrid and Paris and also, incidentally, with London, Brussels, Amsterdam, Berlin, etc. In passing it may be noted that convenient access to Bordeaux is desirable on account of the wine traffic. To avoid the necessity of changing cars at the frontier it was proposed that the line be of the same gage as the French railways, namely, 4 ft. 8½ in.

A secondary object is the usual local freight and passenger business of a railway which in the case of this line, will probably not be very large for the first 10 or 15 years, unless there is some, at present, unexpected mineral or industrial development. There may be developed an additional express passenger service from Valencia and Madrid to San Sebastian and to Pasages, in connection with an ocean steamship service. There may be developed a fairly large business also in the haulage of iron ore between Mt. Moncayo (Soria) and Pasages, and coal from Pasages to the interior, and possibly also to Madrid and Valencia.

There is a possibility of eventually building a line from a point near Soria westerly to Burgos and to the coal fields of Leon and Palencia, which can be used for the distribution of coal to Madrid, Valencia and Barcelona.



Line the Spanish Survey and in the Dotted Line the Survey by the American International Corporation

Traffic

The traffic estimates show that aside from the thorough traffic the business will probably not be very heavy during the first 10 or 15 years, and the estimate of the number of trains and the character of the rolling stock indicate that these will be comparatively light, compared with modern practice in the United States, though considerably heavier than anything now in use in Spain.

Design

The general characteristics controlling the design are, therefore, a country with a rather badly accidented topography, a line for fast passenger service with only moderately heavy rolling stock and the possibility of a fairly heavy low-grade freight service on the northern half of the line.

This indicates a line of first-class construction, with the best gradients and curvatures reasonably obtainable in a difficult country.

The standards of construction adopted for the purpose of the investigation were as noted, briefly, below. They are a compromise between good American practice, the requirements of the Spanish authorities, and the existing conditions in Spain.

A single track line, with provision for the location of passing sidings 1 km. in length every 10 kms., but it was expected that only half of these would be built at first; tunnels to be excavated for double track and bridges to be so located that the abutments can be extended when required. In consideration of this procedure, it should be noted that the cost of tunnel excavation and masonry construction is very low in Spain.

Track to be laid with 90 lb. rails, with 2,000 ties to the mile. Ties of oak are very expensive, so fewer were used with a somewhat heavier rail than would otherwise be necessary. Screw spikes were proposed, with tie plates on the sharper curves. Stone ballast was estimated 12 ins. under the tie and of a typical American cross-section. The European practice is to cover the ends of the ties outside the rails level with the top of the rail.

Bridges were estimated in accordance with A. R. E. A. specifications. Coopers E 50 loading, solid floors. On account of the cheapness of masonry and in accordance with the custom in Spain, masonry viaducts were estimated for many crossings where steel would ordinarily be used in the United States.

In accordance with American practice the quantities of steel, masonry, etc., were calculated from tables and diagrams, and the excavation quantities scaled from the profile. In Europe even for a preliminary estimate it seems to be customary to draw more or less detailed plans of each structure and actually calculate all the quantities, cross-sections being platted from the topography for estimating the earthwork, and this is necessary in the submission of plans to the government.

A 2 per cent grade compensated for curvature was adopted tentatively for the reconnaisance survey, but it is expected that this can be bettered at little additional expense when the final studies are made; the minimum radius of curvature adopted was that of a 5 degree metric curve, i. e., about 230 metres (760 ft.) radius.

A discussion of the reasons which will probably control the final choice of the proper rates of gradients on this line were given in the report, but this is a matter with which engineers are generally familiar, but in regard to curvature European engineers, largely, perhaps, on account of the types of rolling stock available, are generally prejudiced against the use of sharp curvature on main lines, and the following extract from the report may, therefore, be of interest; as it was written for the purpose of attempting to overcome this prejudice.

Curvature

The minimum radius of curvature for our surveys, namely, 230 metres (760 ft.), while not unduly sharp for American practice in heavy country, is rather less than that customary in Europe. The minimum permitted for the main lines in Spain is 300 metres (practically 1,000 ft.). It must be admitted, of course, that curves with as short a radius as 760 ft. cannot be traversed at high speeds, i. e., at speeds much over, say, 40 miles per hour, but they can be at 30 to 35 miles per hour.

The nature of some of the country traversed by this line, however, is such that the use of flatter curves would quite considerably increase the cost without any commensurate advantage in operating economy. As a concrete example the difference was calculated on a certain given section.

On this section two and a half kilometres (1.5 miles) in length, by the use of 3 degree (metric) curves instead of 5 degree, the excavation quantities would be increased by some 40,000 cubic metres with probably some increase in the masonry for culverts. This may be assumed to involve an additional cost of, say, $25,000. There will be, however, a saving of about 75 degrees of curvature, but even assuming 10 trains daily in each direction and the additional cost of operation at, say, 60 cents per train, per degree, per annum (which is reasonably high for operating conditions in Spain, with comparatively light trains and low wages), will be only $450 per annum. Assuming that capital is worth 7 per cent, the saving of this amount of curvature would only justify an expenditure of about $6,500.

These values, of course, are subject to such revision as more careful and detailed study of the traffic and characteristics of the line may indicate, but the figures tend to confirm the writer's opinion that in a country of this nature the minimum radius adopted for our surveys should be retained, though on the other portions of the line the minimum radius could probably easily be established at 382 metres (1,200 ft.), or that of a 3 degree metric curve.

It was recommended that the use of the shorter radius curves be confined to three sections having a total length of 85 kilometres, as follows:

KM. 78 to Km. 108
KM. 253 to Km. 275.
Pamplona to the frontier.

On all the rest of the line the minimum radius can be that of a 3 degree metric curve (1,260 ft.), and by thus confining the heavy curvature to certain sections the objection from the point of view of speed is reduced to a minimum.

So far as this line in Spain is concerned, we are rather handicapped by the need of having the rolling stock conform to French practice in the matter of couplings, and the use of side buffers, which does not permit the flexibility on sharp curves which our center couplings do.

The use of bogie trucks, however—i. e., the common American practice—permits much greater flexibility than the stiff frame 3-axle coaches with long rigid wheel base, still quite generally used in Europe today. (See Fig. 12, Part I, *Railway Age*, of March 28, page 829.

It is impossible within the limits of an article of this kind to discuss the location in detail. Practically an entirely new line was located for a distance of 345 kms. north of Madrid to Mendigoria. From that point to the frontier, a further distance of 71 kms., the general route of the original commission was adopted. An approximate comparison of the physical characteristics of the two lines between Madrid and Mendigoria is as follows:

	Spanish Government Commission	Survey of 1917
Length Kms.	372	345
Curvature degrees	15,095	10,000
Rise and fall meters	1,709	1,500
Rise and fall on 2 per cent gradients	1,093	690
Tunnel Kms.	55	11

In connection with this proposed direct line to France it is proposed to build a branch from a point near Soria to Calatayud, where connection would be made with the Central of Aragon Railway permitting through service from Valencia to the north coast of Spain and to France. It was proposed also to build a line from Pamplona to San Sebastian and to Pasages, on the north coast.

San Sebastian is the well-known summer resort on the Bay of Biscay, and Pasages, a small hand-locked harbor just east of San Sebastian, has possibilities of development as a point of export for the iron ore of Mt. Moncavo, for the importation of coal either from Gijon or England, and as a terminus for a transatlantic steamship line.

Besides facilitating the through traffic between the capitals of France and Spain, and serving as a link in a new transcontinental route, the "Direct" line is of extreme importance from a military strategic point of view. It offers also an opportunity to further develop the iron ore resources of northern Spain, and would be an important factor in the distribution of coal from the north coast to the interior plateau and the eastern Littoral. The statistics of commercial development show that the railroad and port facilities have not kept pace with the requirements of business and this line with the development of Pasages will overcome at least partially this lack of transportation and terminal facilities.

The writer was given every facility in his investigations and every courtesy was extended by officials of all kinds, both of the national and provincial governments, and while some of the regulations were thought vexatious at times on account of the delays involved, it is realized on looking back that they were not more so than might be expected in attempting to do things differently in any country with fairly fixed notions of procedure, and possibly no more so than are often experienced here at home in dealing with our own officials. It is believed that Spain will welcome the co-operation of Americans in carrying out public works which are needed, if the financial participation can be satisfactorily arranged.

American Railway Engineering Association Committee Work

THE AMERICAN RAILWAY ENGINEERING ASSOCIATION has just issued a bulletin giving the personnel of committees and assignment of committee work for the 22 regular committees and 2 special committees of that association, as organized for the coming year. Duplicate information is contained in Circular No. S II-I, issued by the American Railroad Association, Section II—Engineering. Only four new chairmen have been selected for the standing committees of the association, 20 chairmen having been held over. J. R. W. Ambrose, chief engineer, of the Toronto Terminals Company, Toronto, succeeds W. M. Dawley, assistant engineer of the Erie at New York City, as chairman of the Committee on Roadway. H. L. Ripley, valuation engineer of the New York, New Haven & Hartford, Boston, Mass., succeeds H. E. Hale, group engineer for the Presidents' Conference Committee on Valuation, New York City, as chairman of the Committee on Ballast. J. J. Yates, bridge engineer of the Central Railroad of New Jersey, New York, succeeds F. L. Thompson, chief engineer of the Illinois Central, Chicago, as chairman of the Committee on Masonry. Arthur Crumpton, assistant valuation engineer of the Grand Trunk, Montreal, Can., succeeds W. F. Strouse, assistant chief engineer, Public Service Commission of Maryland, Baltimore, Md., as chairman of the Committee on Signs, Fences and Crossings.

Owing to the nature of the subjects assigned to the committees for investigation and to the fact that not more than two can be reported to the convention for action any one year, many of the subjects submitted last year have been carried over. Among the new subjects assigned to the committees for investigation during the present year are the following:

Ballast—Report on the use of reinforced concrete slabs or other devices to assist the ballast in distributing the load on soft roadbed.

Rail—Present revised specifications for steel rails. Present sections for rails heavier than 120 lb. per yd. Report on the effect of usage on the physical properties of rail steel.

Track—Investigate and report upon the design and use of a "clamp" type of frog.

Buildings—Review recommendation as to the applicability of the high platform.

Masonry—Investigate the distribution of loads through ballast and embankment as affecting the design of masonry structures. Report on methods of conveying and depositing concrete.

Signals and Interlocking—Investigate and report upon the effect of the use of ties treated with any solution which affects the length of signal track sections.

Water Service—Report on the water service organization. Submit definitions applicable to water service. Report upon plans and specifications for typical water station layouts, collaborating with the committee on Yards and Terminals and on Economics of Railway Operation.

Yards and Terminals—Report on unit operation of railroad terminals in large cities, revising the catechism as a statement of principles for inclusion in the Manual.

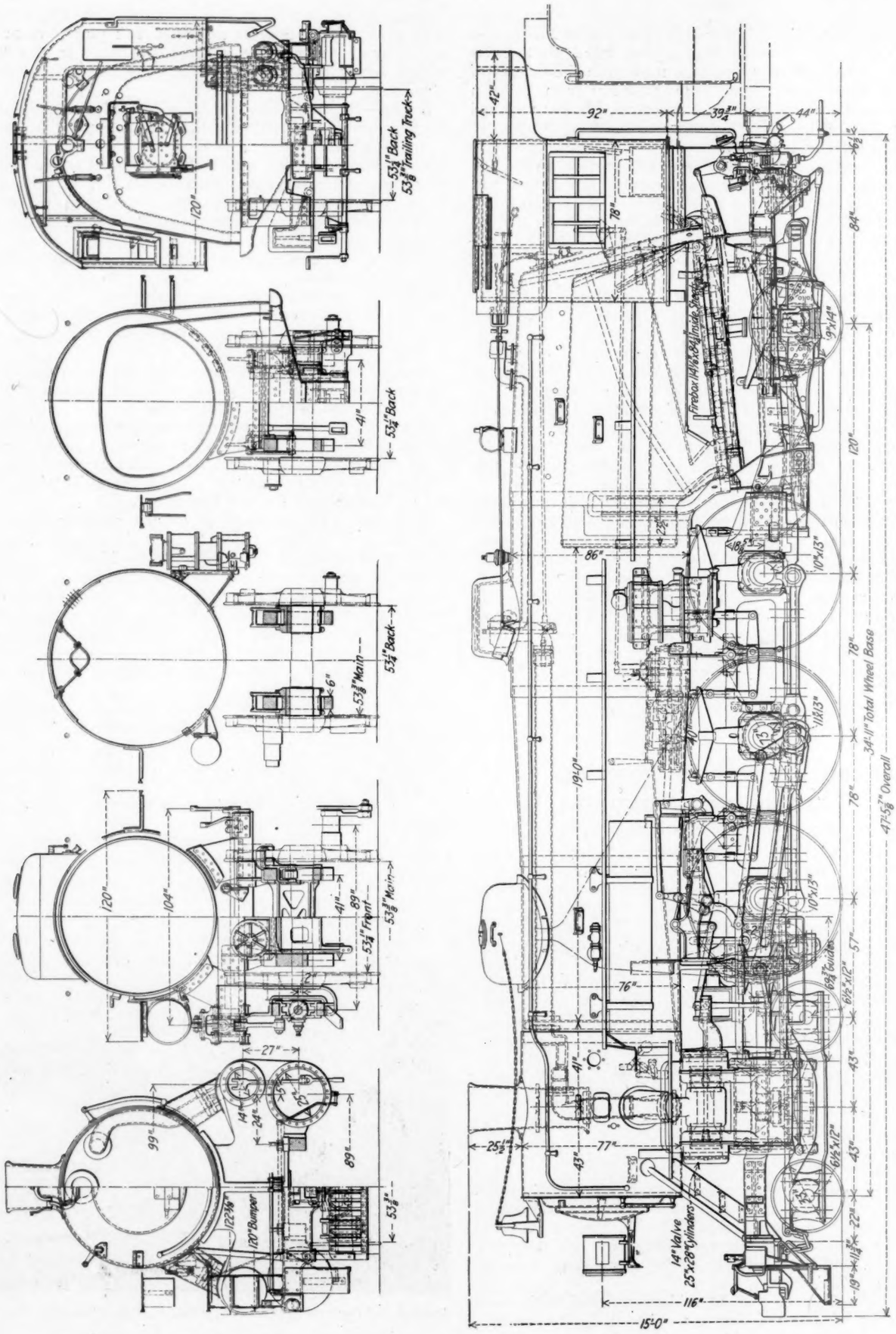
Wood Preservation—Report on the availability and use of sodium fluoride as a preservative for cross ties. Report on creosote treatment to be used in the protection of piles and timbers in teredo-infested water, specifying the amount of creosote to be used. Report on comparative value of grades 1, 2 and 3 creosote oil and creosote coal tar solutions as preservative agencies.

Electricity—Continue collecting statistical data relative to clearances of third rail and overhead working conductors and submit revised tables at the next annual meeting. Cooperate with the Bureau of Standards in the preparation of the proposed National Electrical Safety Code and other safety codes of similar character. Submit specifications for insulated wire and cables.

Economics of Railway Labor—Study and report upon methods for training and educating engineering and maintenance department employees.

American Red Cross Official Photo. Copyright by Press Illustrating Service

Headquarters Siding on the Archangel Front



Elevation and Sections of the Standard Light Pacific Type Locomotive

Light and Heavy Standard Pacific Type Locomotives

Straightforward Designs Having Many Details Interchangeable with the Other Standard Types

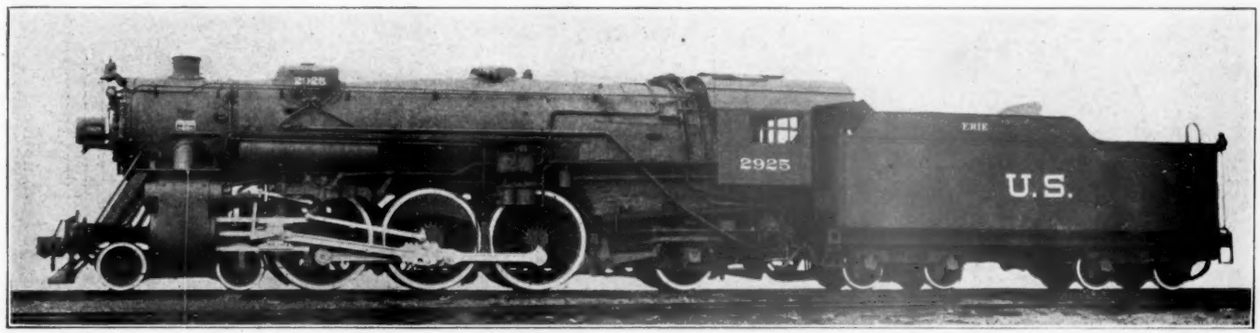
THE FIRST OF THE TWO CLASSES of Pacific type locomotives built to the United States Railroad Administration's standard designs have recently been turned out of the Richmond Works of the American Locomotive Company, the light locomotive for delivery to the Atlantic Coast Line and the heavy locomotive for delivery to the Erie. The light locomotive is one of a total of 59 of these locomotives which have been ordered by the Railroad Administration, 26 to be built by the American Locomotive Company and 33 by the Baldwin Locomotive Works. Orders have been placed for a total of 20 of the heavy locomotives, 10 with each of the above mentioned builders.

The light Pacific type was designed on the basis of driving wheel loads of 55,000 lb. per axle and has a total weight of 277,000 lb. in working order. The actual driving axle loads are 54,000 lb. each, and a tractive effort of 40,700 lb. is developed. In Table I will be found a comparison of this locomotive with a number of others of the same type designed on the basis of approximately the same axle loads. It will be seen that the standard locomotive is somewhat similar in its proportions to the Missouri, Kansas & Texas locomotive, which, however, has more heating surface, but a considerably smaller grate and a smaller ratio of firebox heating surface to total heating surface.

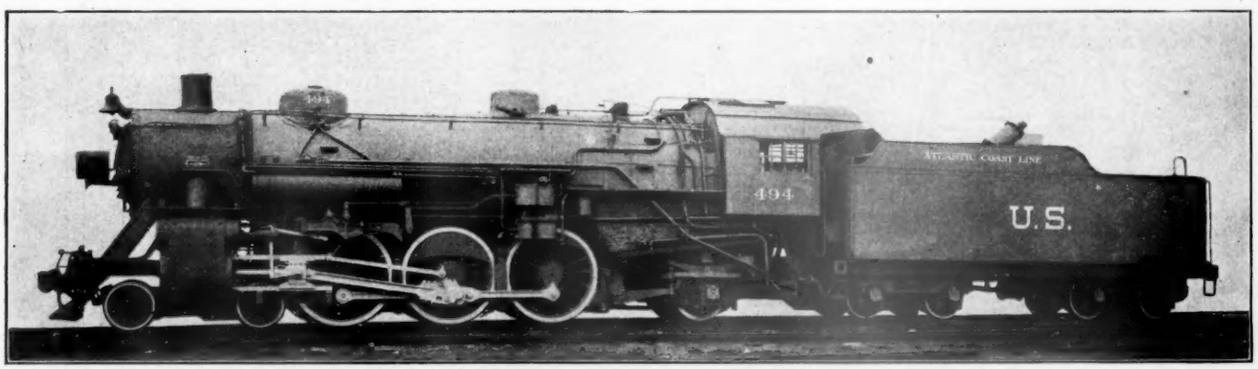
The design of the heavy Pacific locomotive was based on driving axle loads of 60,000 lb. The actual weight on drivers, however, is 197,000 lb., equivalent to slightly less than an average of 66,000 lb. on each axle. The total weight of this locomotive in working order is 306,000 lb. and it has a maximum tractive effort of 43,900 lb.

In Table II will be found a comparison of this locomotive with several other heavy Pacific type locomotives. The heavy standard locomotive compares more closely with the Pennsylvania K4s Pacific than with any of the others. It has about 4,000 lb. less weight on drivers than the Pennsylvania locomotive, with a total weight 3,000 lb. less, and on a comparative basis is rated at 600 lb. less starting tractive effort. A comparison of the heating surfaces of the two locomotives would indicate that the Pennsylvania locomotive had a considerably greater capacity for high sustained speed when handling similar loads.

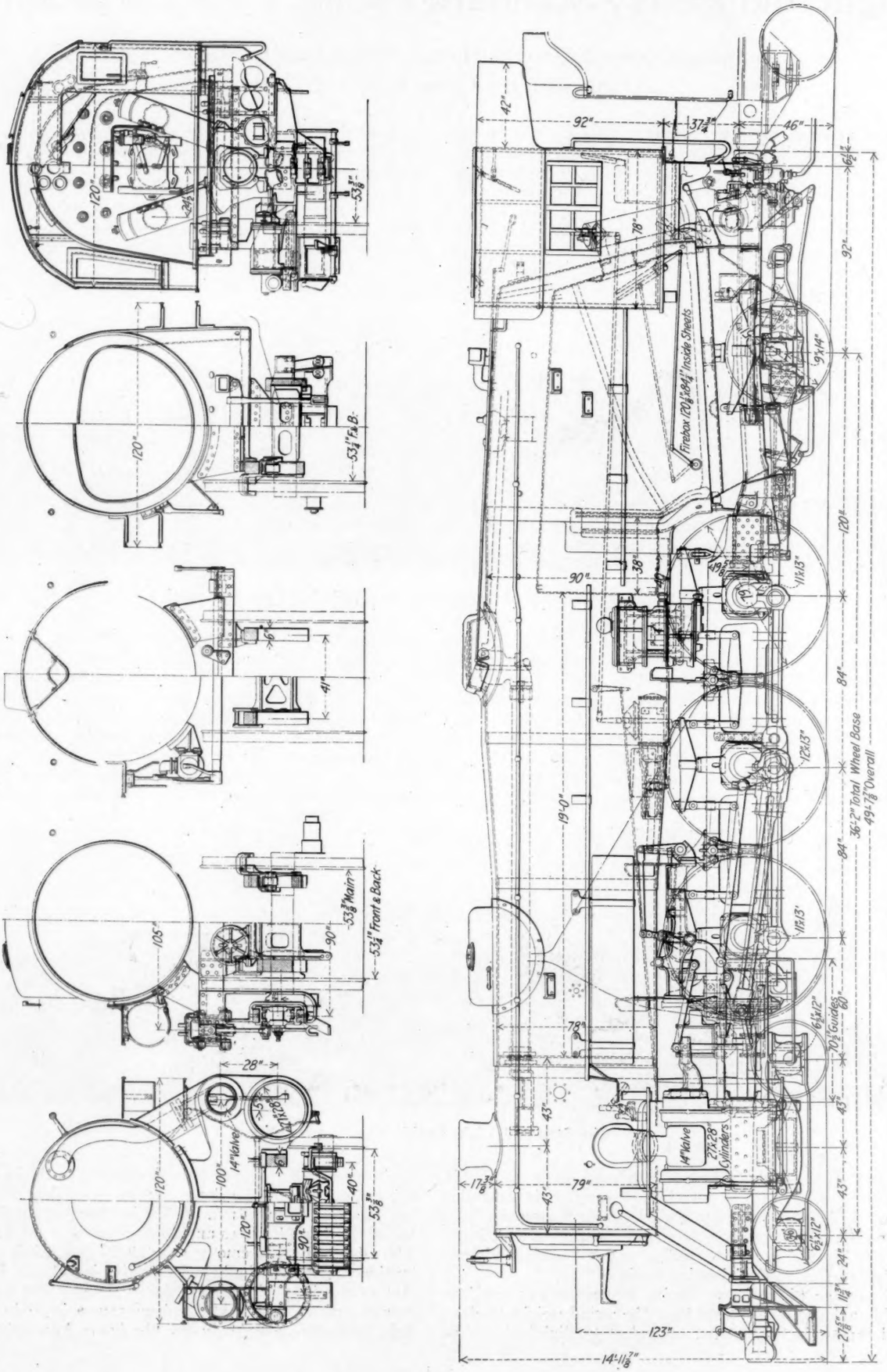
The boilers of the two standing Pacific type locomotives are generally similar in construction, both being of the conical wagon top type with combustion chamber fireboxes. The outside diameter at the first ring of the two boilers is 76 in. and 78 in., respectively, increasing to 86 in. and 90 in., respectively, at the dome course. The light locomotive has 188 2¼-in. tubes and 36 5½-in. flues, while the heavy locomotive has 216 tubes and 40 flues of the same diameters. The tubes of both locomotives are 19 ft. long, while the combustion chamber of the light locomotive is 23½ in. long and that of the heavy locomotive 38 in. long. The maximum diameter of the boilers at the dome course is 86 in. for the light locomotive and 90 in. for the heavy locomotive. The



The Railroad Administration Standard Heavy Pacific Type Locomotive



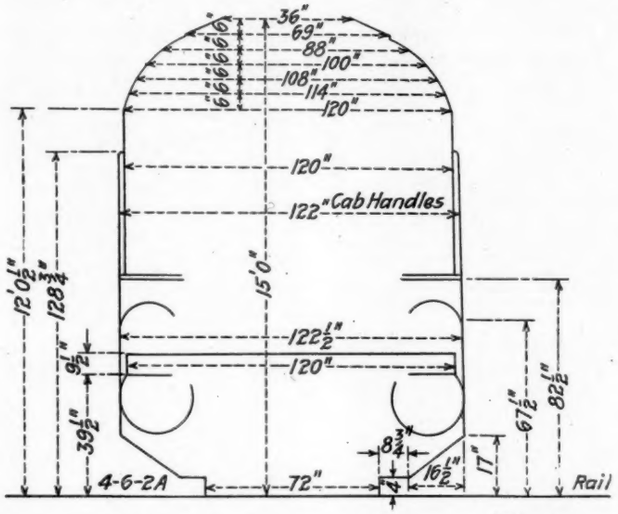
The Standard Light Pacific Type Locomotive



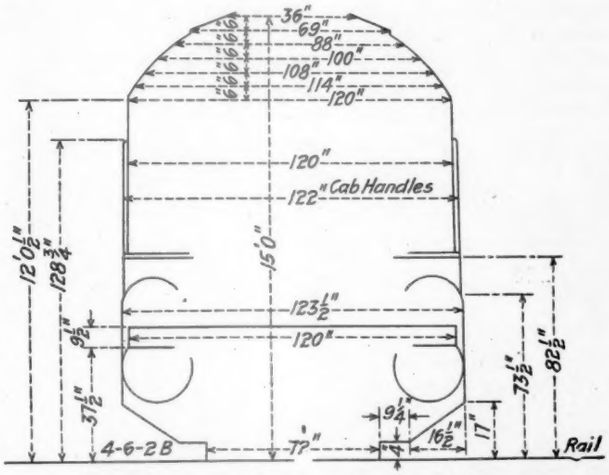
Elevation and Sections of the Standard Heavy Pacific Type Locomotive

fight locomotive is hand fired, while the heavy engine is equipped with a Duplex stoker.

The design of the frames for both types is essentially the same. Both are of the single front rail type, each frame being cast in one piece with a splice back of the rear driving wheels for Commonwealth cradle castings. In both cases the frames are six inches wide. The lighter frames have a depth of top rail of 6⅛ in. over the driving boxes and a minimum depth of 5⅛ in. between the drivers. The maximum and minimum depths of the lower rail are 4¼ in. and 3¾ in., respectively. The frames for the heavy Pacific have a depth over the driving boxes of 7⅛ in. and a minimum depth of top rail of 6 in., while the maximum and minimum depths of the lower rail are 4¾ in. and 4¼ in., respectively.

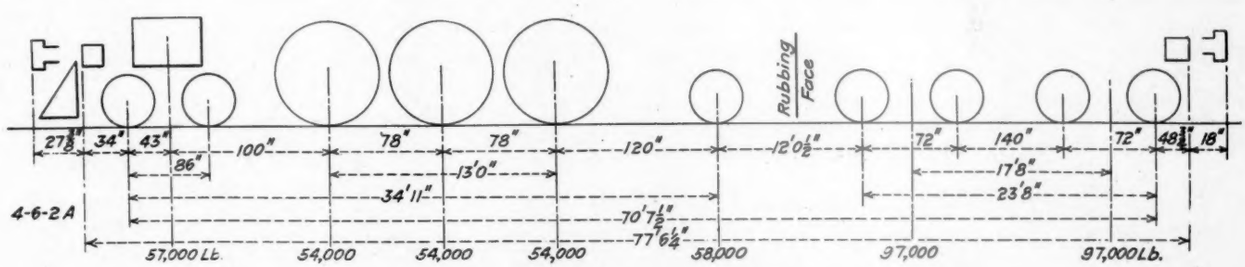


Clearance Diagram for the Light Pacific Type Locomotive

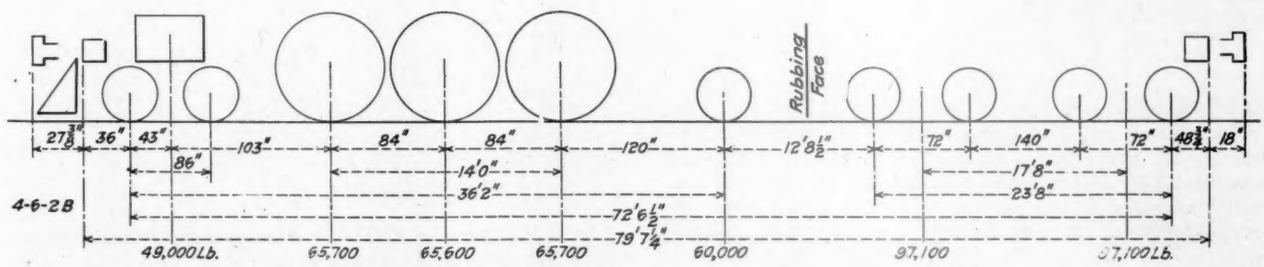


The Heavy Pacific Type Clearance Diagram

The design of the cylinders and valve chambers for the light Pacific type are 25 in. in diameter, while the heavy locomotives have 27-in. cylinders, the stroke being 28 in. in both cases. The pistons are of the single plate dished type, the specifications calling for either cast or rolled steel, with a cast iron bull ring and packing rings of Hunt-Spiller gun iron. In both cases the cylinders and valve chambers are fitted with the Hunt-Spiller gun iron bushings. The piston and rod of the light Pacific type are interchangeable with those of the Eight-wheel switcher, while the piston on the heavy Pacific type interchanges with that used on the heavy Mikado and Mountain type locomotives and the light Santa Fe type. The crosshead is also essentially the same as that used on all the other locomotives and that of the light Pacific interchanges with the crosshead of the Eight-wheel switcher and the light Mikado type locomotive. While



The Distribution of the Weight of the Light Pacific Type Locomotive



Weight Distribution Diagram for the Heavy Pacific Type Locomotive

The cylinders of both types are similar in design to those on all of the other single unit standard locomotives and both are designed for the use of 14-in. piston valves. Those of none of the cylinder designs are interchangeable, the front and back heads have been made interchangeable where the diameter of the cylinders is the same, those for the light Pacific interchanging with the Eight-wheel switcher, and those for the heavy Pacific interchanging with the heavy

Mikado and the light Santa Fe and Mountain type locomotives.

Both the main and side rods are of channel section, the main rod design for all of the standard locomotives being the same in all details with the exception of the necessary variation in dimensions. The two Pacific type locomotives are the only ones having the channel section side rods, the others all being of slab section.

Wherever the journal sizes permit, the driving boxes have been made interchangeable on all of the locomotives. The light Pacific type locomotive has main journals 11 in. in diameter by 13 in. in length, while the front and back journals are one inch less in diameter. The front and back driving journals of the heavy Pacific are the same size as those of the main journals on the light Pacific, while the main journals of the heavier locomotive are 12 in. in diameter by 13 in. in length.

Both locomotives have the constant resistance type engine truck with 6½-in. by 12-in. journals and 33-in. wheels, while the trailer trucks are of the Cole-Scoville design with 43-in. wheels and 9-in. by 14-in. journals. A considerable degree of interchangeability exists between the details of this type of truck in use on the standard Mountain and Pacific type locomotives, although complete interchangeability of the trucks as a whole has not been maintained in every case.

The tenders of both locomotives are built with Commonwealth cast steel frames and have tanks of 10,000-gal. capacity. The tender trucks for both are of the Commonwealth equalized type, differing from the trucks under the heavy Mountain type, which were equalized swing motion trucks of the locomotive builder's design.

Aside from the parts already mentioned a large measure of interchangeability has been carried throughout the various standard designs, including a large number of minor details, such as rod brasses, grate frames, bumper beams, many of the small castings, and in a number of cases, crank pins, axles and springs as well. A complete list of the specialties on all of the standard locomotives was published in the January 3, 1919, issue of the *Railway Age* on page 91.

TABLE I—COMPARISON OF LIGHT PACIFIC TYPE LOCOMOTIVES

Road	A. C. L.	M. K. & T.	C. B. & Q.	N. Y. N. H. & H.
Year built	1919	1915	1915	1916
Tractive effort, lb.	40,700	40,700	42,000	40,800
Total weight, lb.	277,000	272,000	266,400	266,000
Weight on drivers, lb.	162,000	165,000	169,700	165,000
Diameter, drivers, in.	73	73	74	79
Cylinders, diameter and stroke, in.	25 by 28	25 by 28	27 by 28	26 by 28
Boiler pressure, lb.	200	200	180	200
Heating surface, total, sq. ft.	3,333	3,838	3,364	3,315
Superheating surface, sq. ft.	794	870	751	776
Grate area, sq. ft.	66.7	57.5	58.7	59.2
Tractive effort × dia. drivers ÷ equivalent heating surface	656.7	577.0	693.0	719.6
Equivalent heating surface ÷ grate area	67.8	89.5	76.4	75.7
Firebox heating surface ÷ equivalent heating surface, per cent.	5.8	4.8	6.5	6.7

TABLE II—COMPARISON OF HEAVY PACIFIC TYPE LOCOMOTIVES

Road	Erie	P. R.R.	D. L.& W.	L. V.
Year built	1919	1914	1915	1916
Tractive effort, lb.	43,900	44,500	47,506	48,800
Total weight, lb.	306,000	308,900	305,000	301,500
Weight on drivers, lb.	197,000	201,800	197,300	192,200
Diameter drivers, in.	79	80	73	73
Cylinders, dia. and stroke, in.	27 by 28	27 by 28	27 by 28	27 by 28
Boiler pressure, lb.	200	205	200	205
Heating surface, total, sq. ft.	3,824	4,035	3,680	4,103
Superheating surface, sq. ft.	887	1,154	760	75
Grate area	70.8	70	91.3*	75
Tractive effort × dia. drivers ÷ equivalent heating surface.	672.9	580.6	719.4	639.2
Equivalent heating surface ÷ grate area	72.8	82.3	52.8	74.3
Firebox heating surface ÷ equivalent heating surface, per cent.	6.3	5.0	7.7	6.6

* For anthracite coal.

The clearance diagrams and wheel load diagrams were prepared by F. P. Pfahler, chief mechanical engineer, division of operation, of the Railroad Administration. The distribution of wheel loads as shown are actual weights of the completed locomotive.

The principal dimensions and data for the two Pacific type locomotives are as follows:

	Light 4-6-2	Heavy 4-6-2
General Data		
Gage	4 ft. 8½ in.	4 ft. 8½ in.
Service	Passenger	Passenger
Fuel	Bit. coal	Bit. coal
Tractive effort	40,700 lb.	43,900 lb.
Weight in working order	277,000 lb.	306,000 lb.
Weight on drivers	162,000 lb.	197,000 lb.
Weight on leading truck	57,000 lb.	49,000 lb.
Weight on trailing truck	58,000 lb.	60,000 lb.
Weight of engine and tender in working order	471,000 lb.	500,200 lb.
Wheel base, driving	13 ft.	14 ft.
Wheel base, total	34 ft. 9 in.	36 ft. 2 in.
Wheel base, engine and tender	68 ft. 7½ in.	70 ft. 8½ in.
Ratios		
Weight on drivers ÷ tractive effort	4.0	4.5
Total weight ÷ tractive effort	6.8	7.0
Tractive effort × diam. drivers ÷ equivalent heating surface*.	656.7	672.9
Equivalent heating surface* ÷ grate area	67.8	72.8
Firebox heating surface ÷ equivalent heating surface,* per cent	5.8	6.3
Weight on drivers ÷ equivalent heating surface*	35.8	38.2
Total weight ÷ equivalent heating surface*	61.2	59.4
Volume both cylinders	15.9 cu. ft.	18.6 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	284.4	277.1
Grate area ÷ vol. cylinders	4.2	3.8
Cylinders		
Kind	Simple	Simple
Diameter and stroke	25 in. by 28 in.	27 in. by 28 in.
Valves		
Kind	Piston	Piston
Diameter	14 in.	14 in.
Wheels		
Driving, diameter over tires	73 in.	79 in.
Driving, thickness of tires	.....	.....
Driving journals, main, diameter and length	11 in. by 13 in	12 in. by 13 in.
Driving journals, others, diameter and length	10 in. by 13 in.	11 in. by 13 in.
Engine truck wheels, diameter	33 in.	36 in.
Engine truck, journals	6½ in. by 12 in.	6½ in. by 12 in.
Trailing truck wheels, diameter	43 in.	43 in.
Trailing truck, journals	9 in. by 14 in.	9 in. by 14 in.
Boiler		
Style	Con. W. T.	Con. W. T.
Working pressure	200 lb. per sq. in.	200 lb. per sq. in.
Outside diameter of first ring	76 in.	78 in.
Firebox, length and width	114⅛ in. by 84¼ in.	120⅛ in. by 84¼ in.
Firebox plates, thickness	.....	.....
Firebox, water space	.....	.....
Tubes, number and outside diameter	188-2¼ in.	216-2¼ in.
Flues, number and outside diameter	36-5½ in.	40-5½ in.
Tubes and flues, length	19 ft. 0 in.	19 ft. 0 in.
Heating surface, tubes	2,091 sq. ft.	2,407 sq. ft.
Heating surface, flues	981 sq. ft.	1,090 sq. ft.
Heating surface, firebox†	261 sq. ft.	327 sq. ft.
Heating surface, total	3,333 sq. ft.	3,824 sq. ft.
Superheater heating surface	794 sq. ft.	887 sq. ft.
Equivalent heating surface*	4,524 sq. ft.	5,154 sq. ft.
Grate area	66.7 sq. ft.	70.8 sq. ft.
Tender		
Tank	Water Bot.	Water Bot.
Frame	Cast Steel	Cast Steel
Weight	194,000 lb.	194,200 lb.
Water capacity	10,000 gal.	10,000 gal.
Coal capacity	16 tons	16 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
†Includes arch tube heating surface.

The directors of the Illinois Manufacturers' Association have telegraphed to President Wilson that they strenuously protest against the present attitude of the director general of railroads in refusing to make purchases of supplies and material "necessary to the due maintenance of the railroads and to the public safety." They declare that "the elements which enter into prices today are fundamental and should be maintained, including the present standard of wages; and the government should take the immediate initiative in this matter."

Increasing Trainloads By Reducing Grades

By S. S. Roberts
Engineer, Office of Regional Director, Southern Region, Atlanta, Ga.

IN AN ARTICLE in the issue of the *Railway Age* of January 17, 1919, entitled "The Railroad Problem and Economics," by Charles A. Morse, assistant director in charge of engineering and maintenance, Division of Operation, and particularly under the captions "Financing Capital Expenditures" and "Ignorance as to Economics", some simple facts are very plainly stated which have influenced the writer to submit the accompanying table showing the relative efficient hauling power of the U. S. standard light Mikado locomotive on various grades and the number of trains required to handle like net tonnage, in the belief that consideration of this subject is timely and that the table will be helpful to some engineers and to those operating men who will ponder it.

The statement that one locomotive has a tractive effort of 54,000 lb. and that another has a tractive effort of 40,000 lb., is a clear cut expression which at once conveys the suggestion that by substituting the first for the second the hauling power will be increased approximately 35 per cent, and that the number of trains required to handle a like tonnage will be decreased about 26 per cent. The prospect of hauling with three trains that which now requires four is alluring. The saving being in terms of trains, appears to the operating man at once as a determined sum of money. Thinking in terms of locomotives only, all this good may be had for the cost of the new locomotives less the salvage on the old. The economy seems self-evident and the adoption of the proposal is urged on the maxim, "Res ipsa loquitur".

But does "the thing speak for itself"? How about the new bridges, new engine pits, enlarged engine houses, new

EFFECT OF GRADIENTS ON EFFECTIVE HAULING POWER OF U. S. STANDARD LIGHT MIKADO LOCOMOTIVES

Tractive effort = T = 54,600 lb.
Grade resistance = R_g = 20 (rate per cent grade).
Train resistance = R_t = 6.1 lb. per ton of 2,000 lb.
Weight locomotive, tender and caboose = W = 260 tons.

Columns give effective hauling power referred to gradient at top of column as 1 or 100 per cent.
Lines give number of trains on various gradients for one train on gradient shown at left of line.

Gradient per cent.	Rise in feet, per mile.	Gross rating = C × tractive effort / (Rg + Rt)	Gross rating = T / (Rg + Rt)	Net rating in tons of 2,000 lb. = T/(Rg + Rt) − W	0.00 %	0.10 %	0.20 %	0.30 %	0.40 %	0.50 %	0.60 %	0.70 %	0.80 %	0.90 %	1.00 %	1.10 %	1.20 %	1.30 %	1.40 %	1.50 %
0.00	0.00	0.16393	8951	8691	1.000	1.341	1.689	2.044	2.406	2.776	3.152	3.539	3.934	4.333	4.744	5.164	5.593	6.031	6.481	6.942
0.10	5.28	0.12346	6741	6481	.746	1.000	1.259	1.524	1.794	2.070	2.351	2.639	2.931	3.231	3.538	3.851	4.170	4.498	4.833	5.177
0.20	10.20	0.09901	5406	5146	.592	.794	1.000	1.210	1.425	1.643	1.866	2.095	2.327	2.565	2.809	3.058	3.311	3.571	3.837	4.110
0.30	15.84	0.08264	4512	4252	.489	.656	.826	1.000	1.177	1.358	1.542	1.731	1.923	2.120	2.321	2.524	2.736	2.951	3.171	3.396
0.40	21.12	0.07092	3872	3612	.416	.557	.702	.849	1.000	1.154	1.310	1.471	1.634	1.801	1.972	2.146	2.324	2.507	2.694	2.885
0.50	26.40	0.06211	3391	3131	.360	.483	.608	.736	.867	1.000	1.136	1.275	1.416	1.561	1.709	1.860	2.015	2.173	2.335	2.501
0.60	31.68	0.05525	3017	2757	.317	.425	.536	.648	.763	.880	1.000	1.123	1.247	1.374	1.505	1.638	1.774	1.913	2.056	2.202
0.70	36.96	0.04975	2716	2456	.283	.379	.477	.578	.680	.784	.891	1.000	1.111	1.224	1.341	1.459	1.580	1.704	1.831	1.962
0.80	42.24	0.04525	2471	2211	.254	.341	.430	.520	.612	.706	.802	.900	1.000	1.102	1.207	1.314	1.423	1.534	1.648	1.766
0.90	47.52	0.04149	2266	2006	.231	.310	.390	.472	.555	.641	.728	.817	.907	1.000	1.095	1.192	1.291	1.392	1.496	1.602
1.00	52.80	0.03881	2092	1832	.211	.283	.356	.431	.507	.585	.664	.746	.829	.913	1.000	1.089	1.179	1.271	1.366	1.463
1.10	58.08	0.03559	1943	1683	.194	.260	.327	.395	.466	.538	.610	.685	.761	.839	.919	1.000	1.083	1.168	1.255	1.344
1.20	63.36	0.03322	1814	1554	.179	.240	.302	.365	.430	.496	.564	.633	.703	.775	.848	.923	1.000	1.078	1.159	1.241
1.30	68.64	0.03115	1701	1441	.166	.222	.280	.339	.399	.460	.523	.587	.652	.718	.787	.856	.927	1.000	1.075	1.151
1.40	73.92	0.02933	1601	1341	.154	.207	.261	.315	.371	.428	.486	.546	.607	.668	.732	.797	.863	.931	1.000	1.071
1.50	79.20	0.02770	1512	1252	.144	.193	.243	.294	.347	.400	.454	.510	.566	.624	.683	.744	.806	.869	.934	1.000
1.60	84.48	0.02625	1433	1173	.135	.181	.228	.276	.325	.375	.425	.478	.531	.585	.640	.697	.755	.814	.875	.937
1.70	89.76	0.02494	1362	1102	.127	.170	.214	.259	.305	.352	.400	.449	.498	.549	.602	.655	.709	.765	.822	.880
1.80	95.04	0.02375	1297	1037	.119	.160	.202	.244	.287	.331	.376	.422	.470	.517	.566	.616	.667	.720	.773	.828
1.90	100.32	0.02268	1238	978	.113	.151	.190	.230	.271	.312	.355	.398	.442	.488	.534	.581	.629	.679	.729	.781
2.00	105.60	0.02169	1184	924	.106	.142	.180	.217	.256	.295	.335	.376	.418	.461	.504	.549	.595	.641	.689	.738
2.10	110.88	0.02079	1135	875	.101	.135	.170	.206	.242	.279	.317	.356	.396	.436	.478	.520	.563	.607	.653	.699
2.20	116.16	0.01996	1090	830	.095	.128	.161	.195	.230	.265	.301	.338	.375	.414	.453	.493	.534	.576	.619	.663
2.30	121.44	0.01919	1048	788	.091	.122	.153	.185	.218	.252	.286	.321	.356	.393	.430	.468	.507	.547	.588	.629
2.40	126.72	0.01848	1009	749	.086	.116	.146	.176	.207	.239	.271	.305	.339	.373	.409	.445	.482	.520	.559	.598
2.50	132.00	0.01782	973	713	.082	.110	.139	.168	.197	.228	.259	.290	.322	.355	.389	.424	.459	.495	.532	.569
2.60	137.28	0.01721	940	680	.078	.105	.132	.160	.188	.217	.247	.277	.308	.339	.371	.404	.438	.472	.507	.543
2.70	142.56	0.01664	908	648	.075	.100	.126	.152	.179	.207	.235	.264	.293	.323	.354	.385	.417	.450	.483	.518
2.80	147.84	0.01610	879	619	.071	.096	.120	.146	.171	.198	.225	.252	.280	.309	.338	.368	.398	.430	.462	.494
2.90	153.12	0.01560	852	592	.068	.091	.115	.139	.164	.189	.215	.241	.268	.295	.323	.352	.381	.411	.441	.473
3.00	158.40	0.01513	826	566	.065	.087	.110	.133	.157	.181	.205	.230	.256	.282	.309	.336	.364	.393	.422	.452

Gradient per cent.	Rise in feet, per mile.	Gross rating = C × tractive effort / (Rg + Rt)	Gross rating = T / (Rg + Rt)	Net rating in tons of 2,000 lb. = T/(Rg + Rt) − W	1.60 %	1.70 %	1.80 %	1.90 %	2.00 %	2.10 %	2.20 %	2.30 %	2.40 %	2.50 %	2.60 %	2.70 %	2.80 %	2.90 %	3.00 %	Gradient per cent
0.00	0.00	0.16393	8951	8691	7.409	7.886	8.381	8.887	9.406	9.933	10.470	11.030	11.600	12.190	12.780	13.410	14.040	14.680	15.360	0.00
0.10	5.28	0.12346	6741	6481	5.525	5.881	6.250	6.627	7.011	7.407	7.808	8.225	8.653	9.090	9.531	10.000	10.470	10.950	11.450	0.10
0.20	10.20	0.09901	5406	5146	4.387	4.669	4.962	5.262	5.569	5.881	6.200	6.530	6.870	7.217	7.568	7.941	8.313	8.693	9.092	0.20
0.30	15.84	0.08264	4512	4252	3.624	3.856	4.100	4.348	4.602	4.859	5.123	5.396	5.677	5.964	6.253	6.562	6.869	7.182	7.512	0.30
0.40	21.12	0.07092	3872	3612	3.079	3.278	3.483	3.693	3.909	4.128	4.352	4.584	4.822	5.066	5.312	5.574	5.835	6.101	6.382	0.40
0.50	26.40	0.06211	3391	3131	2.669	2.841	3.019	3.201	3.389	3.578	3.773	3.973	4.180	4.391	4.604	4.832	5.058	5.289	5.532	0.50
0.60	31.68	0.05525	3017	2757	2.350	2.502	2.659	2.819	2.984	3.151	3.322	3.499	3.681	3.867	4.055	4.255	4.454	4.657	4.871	0.60
0.70	36.96	0.04975	2716	2456	2.094	2.229	2.368	2.511	2.658	2.807	2.959	3.117	3.279	3.445	3.612	3.790	3.968	4.149	4.339	0.70
0.80	42.24	0.04525	2471	2211	1.885	2.006	2.132	2.261	2.393	2.527	2.664	2.806	2.952	3.101	3.251	3.412	3.572	3.735	3.906	0.80
0.90	47.52	0.04149	2266	2006	1.710	1.820	1.934	2.051	2.171	2.293	2.417	2.546	2.678	2.813	2.950	3.096	3.241	3.389	3.544	0.90
1.00	52.80	0.03881	2092	1832	1.562	1.662	1.765	1.873	1.983	2.094	2.207	2.325	2.446	2.569	2.694	2.827	2.960	3.095	3.237	1.00
1.10	58.08	0.03559	1943	1683	1.435	1.527	1.623	1.721	1.821	1.923	2.028	2.136	2.247	2.360	2.475	2.597	2.719	2.843	2.974	1.10
1.20	63.36	0.03322	1814	1554	1.325	1.410	1.498	1.589	1.682	1.776	1.872	1.972	2.075	2.179	2.285	2.398	2.510	2.625	2.746	1.20
1.30	68.64	0.03115	1701	1441	1.228	1.308	1.390	1.473	1.560	1.647	1.736	1.829	1.924	2.021	2.119	2.223	2.328	2.434	2.546	1.30
1.40	73.92	0.02933	1601	1341	1.143	1.217	1.293	1.371	1.451	1.533	1.616	1.702	1.790	1.881	1.972	2.069	2.166	2.265	2.369	1.40
1.50	79.20	0.02770	1512	1252	1.067	1.136	1.207	1.280	1.355	1.431	1.508	1.589	1.671	1.756	1.841	1.932	2.023	2.115	2.212	1.50
1.60	84.48	0.02625	1433	1173	1.000	1.064	1.131	1.199	1.269	1.340	1.413	1.489	1.566	1.645	1.725	1.810	1.895	1.981	2.072	1.60
1.70	89.76	0.02494	1362	1102	.939	1.000	1.063	1.127	1.193	1.259	1.328	1.398	1.471	1.545	1.620	1.701	1.780	1.861	1.947	1.70
1.80	95.04	0.02375	1297	1037	.884	.941	1.000	1.060	1.122	1.185	1.249	1.316	1.384	1.454	1.525	1.601	1.675	1.752	1.832	1.80
1.90	100.32	0.02268	1238	978	.834	.888	.943	1.000	1.058	1.118	1.178	1.241	1.305	1.372	1.438	1.509	1.580	1.652	1.728	1.90
2.00	105.60	0.02169	1184	924	.788	.834	.891	.945	1.000	1.056	1.113	1.174	1.234	1.296	1.359	1.426	1.492	1.561	1.633	2.00
2.10	110.88	0.02079	1135	875	.746	.794	.844	.895	.947	1.000	1.054	1.110	1.168	1.227	1.287	1.350	1.414	1.478	1.546	2.10
2.20	116.16	0.01996	1090	830	.708	.753	.800	.849	.898	.949	1.000	1.053	1.108	1.164	1.220	1.281	1.341	1.402	1.466	2.20
2.30	121.44	0.01919	1048	788	.672	.715	.760	.806	.853	.901	.949	1.000	1.052	1.105	1.159	1.216	1.273	1.331	1.392	2.30
2.40	126.72	0.01848	1009	749	.639	.680	.722	.766	.811	.856	.902	.951	1.000	1.050	1.101	1.156	1.210	1.265	1.323	2.40
2.50	132.00	0.01782	973	713	.608	.647	.688	.729	.772	.815	.859	.905	.952	1.000	1.049	1.100	1.152	1.204	1.260	2.50
2.60	137.28	0.01721	940	680	.580	.617	.656	.695	.736	.777	.819	.863	.908	.954	1.000	1.049	1.099	1.149	1.201	2.60
2.70	142.56	0.01664	908	648	.552	.588	.625	.663	.701	.741	.781	.822	.865	.909	.953	1.000	1.047	1.095	1.145	2.70
2.80	147.84	0.01610	879	619	.528	.562	.597	.633	.670	.707	.744	.786	.826	.868	.910	.955	1.000	1.046	1.094	2.80
2.90	153.12	0.01560	852	592	.505	.537	.571	.605	.641	.677	.713	.751	.790	.830	.871	.914	.956	1.000	1.046	2.90
3.00	158.40	0.01513	826	566	.484	.514	.546	.579	.613	.647	.681	.718	.756	.794	.832	.873	.914	.956	1.000	3.00

turntables and, on occasion, heavier rails, additional cross ties and more ballast which may or will have to be provided before the advantages of the more powerful locomotives are available?

There are cases in which heavier power has been urged where, in addition to the above, even the embankments would first have to be strengthened, the excavations widened and the spouts on water tanks and the floors of existing coaling platforms would have to be raised to serve the heavier power, and this on roads having 1 per cent and 1.2 per cent ruling gradients. Suggest that the ruling gradients be reduced from 1 per cent to 0.7 per cent which may frequently be done without unusually heavy expenditure, for the ruling gradients generally occur in few places. In how many minds will this suggestion stir the thought that by this reduction in gradients the same increase in effective hauling power and the same decrease in number of trains will be effected as by the change in locomotives first considered? Or that the locomotives already in service will on the reduced gradients haul in three trains that which they before hauled in four. Should the reduction in gradients be from 1 per cent to 0.5 per cent the increase in hauling power of the present locomotives would be 71 per cent and the decrease in the number of trains required for like tonnage would be 41 per cent. In round numbers 10 trains could do the work which formerly required 17.

The anticipated saving accruing from a reduction in gradients is just as sure of realization and the certainty of predictions based on them is equally as reliable as those based on the increased tractive effort of the locomotive. It would seem logical to first improve, so far as practicable, the line and grades and thereby prolong the period of usefulness of existing power and structures to the fullest. Such improvement is permanent. The beneficial results obtained are unaffected by time and are independent of any other causes. Under present conditions this should be an important factor. On roads that have improved alignment and reduced gradients so far as is reasonably practicable, increased hauling power is properly obtainable through increasing the power of the locomotive. Otherwise there is the question whether to increase the power of the locomotive or to decrease the ruling gradient, and that man who decides this economic point without thorough investigation of each side of the question fails in his duty. Present increased returns is not necessarily economy. Economy is the selection of that thing or process which will perform the required service at the least ultimate cost.

The accompanying table was developed for the purpose of aiding in comparing the relative efficiency of different lines having different ruling gradients and gives a reasonable indication of what may be expected from the reduction of ruling gradients. It is comprehensive in that by means of it a broad field of comparison may be made by inspection without computations. And since it gives an answer in "trains", it offers a means for economic comparisons readily reducible to a money basis. The table is based on the net rating of the U. S. standard light Mikado locomotives. The columns give the effective hauling power (cars and contents, exclusive of engine, tender and caboose) on various gradients referred to the gradient indicated at the top of the column as a basis and which may be considered as 1 or 100 per cent. The lines give the number of trains required on the various gradients referred to the gradient indicated in the first or last column as a basis and which may be considered as 1 or 100 per cent.

For a given gradient divide the ascertained tonnage by the net rating in column five opposite that gradient, which gives the number of trains required to move that tonnage. This number of trains multiplied by the quantity on the same line under any other gradient gives the number of trains required to move a like tonnage on the new gradient.

Thus, in the column headed 1 per cent on the line opposite 0.5 per cent, the effective hauling power on a 0.5 per cent gradient is 1.709 times that on a 1 per cent gradient, or the locomotive is 171 per cent efficient on a 0.5 per cent as compared with 100 per cent on a 1 per cent gradient. Similarly on the line opposite 1.5 per cent, the effective hauling power of the locomotive is 0.683 times that on a 1 per cent gradient, or the locomotive is 68 per cent efficient on a 1.5 per cent as compared with 100 per cent on a 1 per cent gradient.

On the line opposite the 1 per cent gradient under the column 0.5 per cent, it is indicated that for each train on a 1 per cent gradient there will be required 0.585 trains on a 0.5 per cent gradient and under the column 1.5 per cent it is shown that for each train on a 1 per cent gradient there will be required 1.463 trains on a 1.5 per cent gradient.

The table may also be used to suggest reductions in gradients to balance trains for unequal tonnage. Thus say the tonnage is in the ratio of 3 in one direction to 4 in the other and the gradients are 1 per cent in each direction. To what gradient should reduction be made against the heavier traffic to balance the trains? The difference in tonnage is 33⅓ per cent of the lighter tonnage, so the efficiency of the locomotive must be 133⅓ per cent of that on the 1 per cent gradient. In the column for 1 per cent gradient on the line opposite 0.7 per cent is found an efficiency of 134.1. Therefore, a reduction to 0.7 per cent will balance the trains.

Or looking at it the other way: To balance the trains the locomotive should show an efficiency of 75 per cent on the 1 per cent gradient as compared with that on the new grade. On the line opposite 1 per cent 0.746 or 74.6 per cent is found in the column headed 0.7 per cent.

The above may be checked from the net ratings given in column four.

$$\text{Thus:—}\quad \frac{\text{Tons}_1}{\text{Rating}_1} = \text{Trains} = \frac{\text{Tons}_2}{\text{Rating}_2}$$ since the trains must be equal.

$$\frac{3}{1832} = \frac{4}{\text{Rating}_2} \quad \text{therefore Rating}_2 = \frac{4 \times 1832}{3} = 2442\tfrac{2}{3}$$

but 2,456 is the rating on 0.7 per cent gradient, which indicates that 0.7 per cent in the nearest even one-tenth per cent to the gradient required to exactly balance the trains.

While the table is worked out for the light Mikado it is believed that it will not be sufficiently different from one worked out for other locomotives to make material difference in the results and it therefore will serve generally for a comparison of the efficiency of different gradients.

Train Wreck Caused Through a Turk Panic Results in Many Fatalities Outside Salonika

Railway Developments in Foreign Countries

British Transport Bill Passes to Its Second Reading—The Problem of Unification of the Railways in China

THE BILL proposing the establishment of a Ministry of Ways and Communications in control of practically all means of transportation in the United Kingdom and Ireland, introduced in the House of Commons on February 27, passed to its second reading without a division, and was committed to a standing committee on March 18, following a two days' discussion in the House and a detailed explanation of its terms by Sir Eric Geddes, who is slated to be the first minister.

Strong opposition was presented to the bill on the part of the road transportation and dock interests, both in the press and during the two days' discussion of the bill in the House of Commons, but without effecting a change in the bill or without impeding its progress. This opposition, as has been noted in the *Railway Age*, was chiefly centered around the idea of putting such extensive powers in the hands of one man—more particularly in the hands of a man who was likely to work out the problems concerning the road and dock interests from a railroad point of view.

Labor has been in favor of the bill, one labor member even going so far as to express his approval of it in the discussion because it would represent an important step in favor of ultimate nationalization. J. H. Thomas, member from Derby, and general secretary of the National Union of Railwaymen, said: "So far as the railwaymen were concerned, they would not consent to allow themselves to be sweated simply for the benefit of the traveling public."

The opposition that might have been introduced in the discussion on the part of the railway interests was largely forestalled by a very important change that the government made in the bill before the second reading by way of eliminating the provision that the minister might purchase any railway, etc., on authority of an order in council a draft of which should be laid before both Houses for 30 days, etc. This, it was feared, might lead to nationalization without opportunity for sufficient consideration, and so great was the opposition to the provision that it had to be radically changed.

The clause in question read in brief as follows:

> The minister may be authorized by order in council at any time after the passing of the act to purchase by agreement or compulsorily and work any railway, light railway, canal, waterway, or inland navigation, harbor or dock undertaking.
>
> The minister is also to have power to establish and work any such undertaking, to lease the whole or any part of any undertaking, acquired or established, to purchase privately-owned railway wagons, and to establish and work transport services by land or water.
>
> All such powers are to extend to any shipping or other services carried on as auxiliary to the principal business of the undertaking.
>
> Before an order in council is made a draft must be laid before each House of Parliament, for not less than 30 days, during which it is sitting, and, if either presents an address against it or any part of it, no further proceedings can be taken on it, without prejudice, however, to the making of any new draft order.

The changes mentioned were outlined in Sir Eric Geddes' speech in the following words:

> It was proposed to take any permanent action by order in council. That order in council would be discussed in this House. It was thought that it would afford reasonable facilities for discussion. But in view of the fact that there is undoubtedly a strong feeling in the House against that procedure the Government will now amend clause 4, eliminating the procedure by order in council. On the other hand, dealing particularly with the provisions of clause 4, sub-section (1) (e) and (f), as regards (e) the Government will definitely seek power in the bill to acquire by purchase or hire and to maintain, work, or lease privately owned railway wagons on terms, failing agreement to be settled by the Railway and Canal Commission. The government will also seek under the bill powers to prohibit the use of privately-owned wagons in future except under license. It is also proposed to transfer the powers in clause 4, subsection (1) (f), which were permanent powers, and make them temporary powers under clause 3, and to provide that in addition during the two years the minister shall have the right, subject to treasury control, to construct such works as may be necessary. That is really essential, if we are to have powers to carry out the scheme—it may be railway development or something of that kind—which we could not reasonably expect the existing railway companies or other transport agencies to undertake.

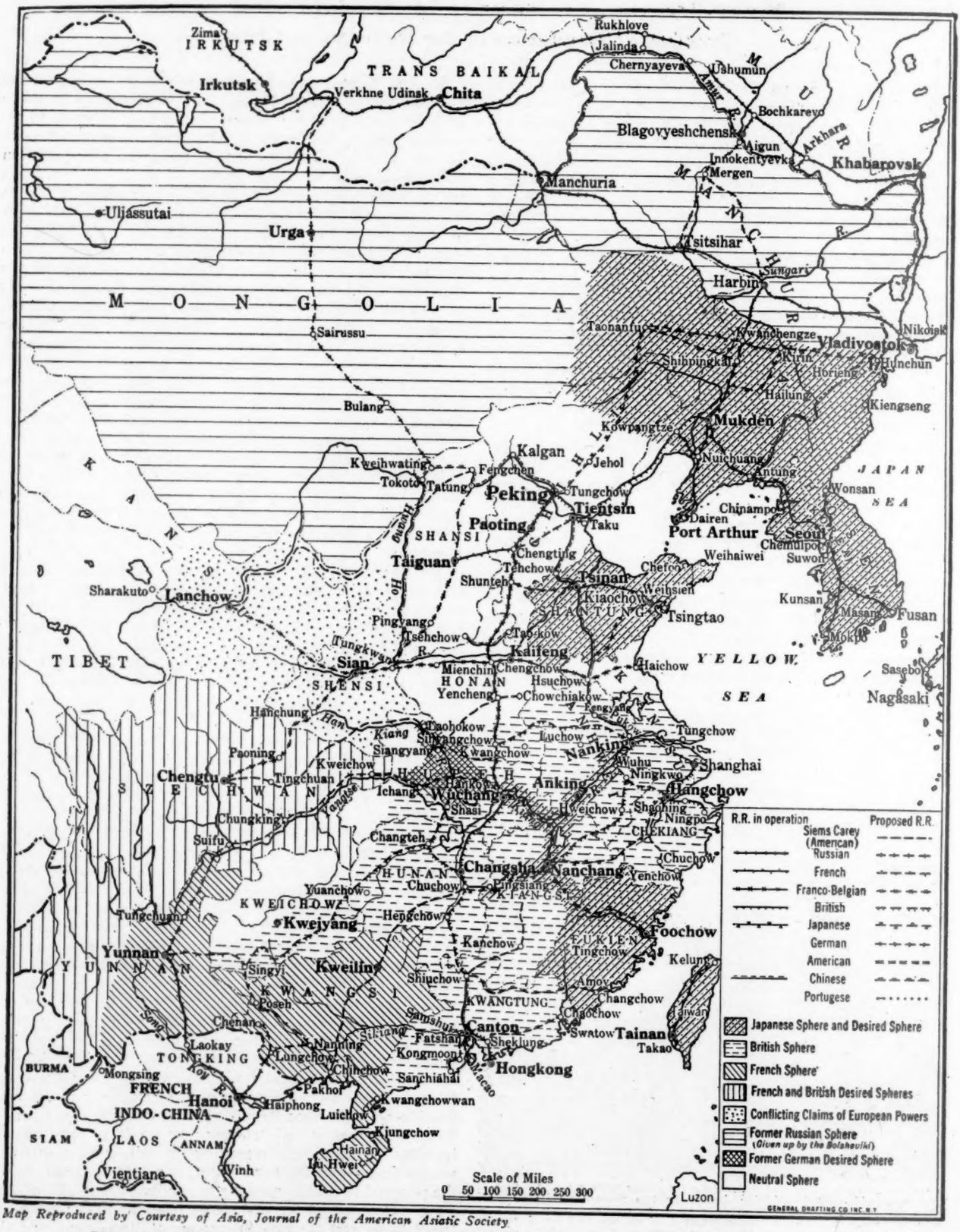
Sir Eric Geddes' speech was abstracted very briefly in the *Railway Age* of March 21, page 787. Inasmuch as he spoke an hour and a half it is impossible for lack of space to reproduce what he said in detail. He emphasized the necessity for the bill, by showing that the means of transportation were "financially in a semi-paralyzed state," and brought out the point that the railways which had earned a return of 4.3 per cent before the war were now losing from 3 to 4 per cent, or suffering a loss of £90,000,000 to £100,000,000 yearly. He explained the necessity for a continuance of unified control of the several railroad companies and of the inclusion of all transportation facilities in general and expressed the opinion of the government that it must work out a definite "transportation policy" for after the war. As far as the two years control mentioned in the bill was concerned, he emphasized that this "temporary period of two years" "was really fixed for us by a letter of Mr. Runciman, president of the Board of Trade in the late government, to the railway companies, when he intimated to them that the cabinet approved the continuance of the guarantee for two years after the war." "Two years," he said, "seemed not an excessive time in which to consider in detail the whole of this very complicated problem," and then emphasized that after the government had had this time to consider a definite policy it could not proceed further without authority from the House.

Mr. Shortt, the home secretary, later added along the same line that: "The withdrawal of the system of orders in council made it clear that the question of nationalization or no nationalization must subsequently be determined by the House"; but that Sir Eric Geddes "had also made it equally clear that whether the railways were internationalized or not, they could never again go back to the system of unfettered competition which existed before the war," the last statement being greeted with cheers.

The London Times says editorially that it was not convinced by Sir Eric Geddes' reasons for taking over such extensive and broad powers as are proposed in the bill. Concerning the railroad problem, however, it says in its issue of March 18:

"When Sir Eric Geddes declares that we have no transportation policy, he is on far surer ground, and we are able to agree with him without reserve. If the great programs of reconstruction and betterment are to be carried into effect, the very first necessity is a drastic improvement and development of our facilities of transportation. Such reforms lie at the root of the schemes for better health, better housing, the expansion of our trade, and all the other projects now being hopefully initiated. The government is therefore right to put transportation in the forefront of their legislation for the new era. Their claim that the railways require some form of amalgamation and unification, in order to eliminate wasteful competition and reduce working expenses, is admitted by the companies themselves. We doubt whether there will be effective opposition in any quarter to the proposal to establish some form of state control over the railways. In no other way is real progress now possible. The intense hostility already visible regarding the bill, even in quarters wholly friendly to the government, is not in the least due to the proposal to place a minister in supreme charge of the railways. It arises, in the first place, from the most unwise attempt to subvert the rightful powers of Parliament, and, in the second place, from the vast scope of the bill itself. We

need not dwell upon the clause which originally gave Sir Eric Geddes an unprecedented degree of authority which he was to use by orders in council. The government have promptly amended the clause by eliminating the procedure in council. The storm this provision provoked should be a wholesome lesson. Henceforth, we may be sure, Parliament will watch most vigilantly any fresh proposals to extend the use of orders in council, a medieval expedient which is



Map Reproduced by Courtesy of Asia, Journal of the American Asiatic Society

Map of the Spheres of Influence in China, Showing Also the Railway Lines—Present and Proposed

entirely opposed to the spirit of Parliamentary government in peace time. The powers sought were in any case unnecessary, as the minister showed by implication. The bill is at present really experimental, as it should be. No question of 'nationalization' of the railways, or any other form of permanent control, arises under it. Sir Eric Geddes admitted that he fully agreed with the committee on transport that much more investigation and experience are required before the final shape of state control over the railways can be determined. It is therefore difficult to understand why such autocratic powers were ever introduced into the measure. What will happen, we gather, is that for two years the new Ministry will gradually and tentatively exercise a general centralized control over the railways, with authority to enforce improvements and to check wasteful working. At the end of two years, when the guarantees to the companies expire, Parliament will be invited to consider some scheme of permanent state control. This is the right way to set to work."

The Proposed Unification of Railways in China—Special Correspondence From Peking

PEKING, March 12.

No subject connected with China in recent years possesses more interest for Americans with railway affiliations than the current proposal for a general unification of all railways in China. For over a month, the topic has been discussed officially and unofficially with a great deal of heat,—being opposed by the subsidized Japanese press, the arms of the present government known to be under Japanese influence and by the Chinese press owing allegiance to such officials. The final decision of the cabinet to present the subject at the Paris Peace Conference indicates that Japanese opinion has veered to the support of the proposition, for only two weeks ago, the Minister of Communications announced that if the cabinet should over-rule his opposition, he would resign.

The motives which have impelled the Chinese government to take this step and the bearings which the move has upon American interests are many. It will be recalled that every principal line, except one, in China has been built by foreign money. At the conclusion of the Chino-Japanese war, Russia, Germany and France extorted from China (as a reward, partly, for forcing Japan to forego her claim to the Liaotung peninsula) the privilege of building railways as private ventures. England and Belgium (the latter with French and Russian backing) secured the privilege of lending China money to build railways in the Yang Ste valley and the interior. All of these privileges (it was considered a privilege then, to lend China money) were conceived to give to the nation holding them certain preferred rights in the territory occupied. When it is remembered that extra-territoriality takes foreign law into the interior with the foreign personnel of such railways, it will be appreciated how Chinese feared their sovereignty to be slipping away. Because of this the American government would not be a party to the intrigues for such concessions, and so although American companies first surveyed the Peking-Hankow line, made the first agreements for the Canton-Hankow line and the Tientsin-Pukow line, and later contracted for a line from the Siberian border through Manchuria south to the Gulf of Pechihli, the Americans were obliged to yield in every case, as the alternative to applying the same pressure to China as other nations were doing. By withdrawing thus, they gained the friendship of China, while others gained some part of China—at least so it seemed for the time being.

Each of the lines so built was constructed without any reference whatever to the standards and practices upon the other lines. There are three gages in China—standard, five feet, and metre. There are two heights of drawbar—the American standard and the English standard some five inches higher. The accounts followed the personal preferences of the chief accountant who happened to be employed. The practice thus followed English, German, French, Russian, Japanese, Indian, and purely Chinese practice. Equipment was invariably purchased in the home country of the loaning syndicate. This privilege is a term in every agreement. As a result the statement made by a railway supply man that "there are not films enough in China to take a picture of each of the different types of equipment," is not wide of the mark. This monopoly of the market upon each line possessed by some European country has had the natural result that American manufacturers could never get an order, unless the European factories were "full up." On the purely Chinese lines Americans have been able to get a good share of the orders, but purely Chinese lines are few and short—and there are no American lines.

And up to the present, it looked as if there would never be any American lines. A prominent American contracting firm came to China early in 1916. It had no difficulty in getting an agreement with the Chinese government to build 2,000 miles of line, the routes to be agreed upon later. Then it started out to locate a route. It found one that looked good in south China. But the French protested that they had had a letter from a former vice-minister promising them that route. Another line was located as an extension to the purely Chinese Peking-Suiyuan. But the Russians produced an agreement on the part of China not to build in the direction of the Siberian border without consulting Russia. Then a line into Szechuan was marked down, but the British clearly proved that this was a legitimate extension of a line which they proposed to build some day. There were still other minor projects which met the same fate, until in exasperation the American asked, "Where in hell is CHINA?"

During the past two years, the Japanese have been very industriously complicating the situation with respect to routes, by loaning the Chinese government large sums upon the undertaking to give Japanese contractors the privilege of building along most of these disputed routes. While not a spadeful of dirt has been turned or a blue print made to represent actual attempts at construction, at least $100,000,000 Mex. has been advanced upon such security. The sudden termination of the war with the unexpected victory of the Allies leaves the Japanese with this considerable sum out on very doubtful security. Nevertheless, they have such an influence over Chinese officialdom with a certain nebulous "special position" recognized by other powers, that it is difficult to see how the situation could be cleared up without a wiping of the slate clean.

With the beginning of the Republic modern minded Chinese clearly perceived that some order must be introduced into railway affairs, and straightaway attempted standardization of accounts. With surprising rapidity they succeeded in getting out uniform classifications of capital expenditures, operating revenues and expenses, income account, balance sheet and a form of annual report. An American adviser was employed in this connection, and a successor still keeps American influence present. But a reactionary ministry followed the death of Yuan Shih Kai and seriously crippled the continuation of that work, and it is charged that there are many ministerial orders directing what is in effect a disregard of the classification. At the same time, certain of the lines have maintained their privileges of deviating from the prescribed classifications in a few matters in which they conceived the foreign interest to be affected.

Some attempt has been made during the same period to weld the service of the same lines into a whole. Through passenger tickets were put into effect and a clearing house established to take care of the division of revenue. But

nothing has been done for goods and when the ministry tried to put through a plan for the general interchange of rolling stock during the past summer, the lines would have nothing to do with it. They make the point that the car supply on several lines is so inadequate that to let a car get off from the home line is to lose it forever, and that the types differ so much that not only are there no spare parts suitable for repair, but that the mechanics of foreign lines can not be trusted to make repairs properly. With the purchase of new equipment which will follow the reduction of war prices, this condition will be perpetuated and intensified. The ministry is powerless to prescribe uniform specifications. It can merely recommend them—but the recommendation is very likely to be ignored, for the new specifications will make it more difficult for the home manufacturer to bid successfully on the order.

The only remedy then is at a time when foreign sentiment is lenient toward changes to secure relief from these conditions. The Yunnan, Shantung, South Manchurian and Chinese Eastern lines have never been governed even by the attempts at uniformity which have been described above. They are private lines purely. But to the forward looking, the present situation if continued will be intolerable. Think of it! If a shipment be attempted from no farther than Harbin to Tientsin, at Changchun the cargo must be transferred from a car of five-ft. gage to one of standard gage, at Mukden it must be transferred again from a car with a low drawbar to one with a high drawbar. If the load went on to Shanghai it would have to be lightered across the Yang Ste river, for there is no ferry. What chance is there against water competition in such a situation. If the car were diverted, instead, to Kalgan, it would have to be transferred again at Peking in order to get into a car with air brakes, necessitated by the grades over the Nankow Pass. There is some reason, therefore, to the present objections toward a general interchange of rolling stock.

But in addition, there is the strong political desire of removing the cloud from the Chinese title to these outlying provinces. If, as it is proposed, these lines, government and foreign, all be redeemed by means of a large refunding mortgage, the whole to be under the trusteeship of an international board, the "sphere of influence" will automatically disappear. Right here is the biggest commercial factor in the whole situation. It has been the fashion to rail at the inability of the Chinese to make progress. As a matter of fact they are to be complimented for their ability in preventing progress. The silently pursued goal of the Chinese has been the prevention of foreign investment in anything, either good or bad, because every foreign investment by so much solidified the foreign power in the affected territory. While competitive armaments, competitive propaganda, competition for "places in the sun" were the order of things in China, there was no other way for foreign governments to advance their interests in China, than by "spheres of influence." But every one familiar with the situation knows that the results were not worth the cost. In 20 years of railway competition there were less than 7,000 miles of line built. During the last ten years there has been barely a thousand miles added, and of this a fifth was added by the Chinese themselves. But with the fear of putting themselves in bondage to the foreigner removed, we may expect to see within the next generation some realization of the hopes which have been entertained of the most numerous, the most industrious, the most patient, and the shrewdest of all peoples—the Chinese.

Orders for American Coal

Coal circles in Glasgow and the west of Scotland, says the London Times, are concerned over the report that the Swedish State Railways have purchased 30,000 tons of American coal for delivery over the next few weeks at Gothenburg, and that the Dutch government has bought 50,000 tons for delivery at Rotterdam. It is admitted that the lower free-on-board prices in America may compensate for the higher Atlantic freights, and developments will be closely watched in British centres.

Shortage of Railway Equipment in Germany

The difficulties Germany is having in fulfilling the terms of the armistice as to railroad equipment were shown in an article in the Vossische Zeitung of December 18, 1918, which has been translated and sent to Commerce Reports by Consul Wallace J. Young, Goteborg, Sweden. The article follows:

The new armistice negotiations in Treves make it necessary to publish exact figures regarding all available rolling stock in Germany, as the question of revising the agreement covering the delivery of locomotives and freight cars will be an important part of the negotiations.

The German national railroads are credited with possessing 36,008 locomotives and 782,529 freight cars. As a matter of fact, there are only 30,709 locomotives available at the present time, and according to a count made last October there are approximately 46,000 passenger cars, 12,000 baggage cars, and 459,000 freight cars. The remaining locomotives and cars were lost in consequence of war or are in the occupied districts or in allied or neutral foreign countries, from which it is not probable that they can be returned in the near future. Locomotives that require repairs figure from 30 to 50 per cent of the total. This is due to the strain put upon them by the war. In addition, there are approximately 43,000 freight cars that require repairs.

Railway Traffic Hindered

In consequence of these conditions it has not only been impossible to deliver our rolling stock to the extent that the allies required but the German railway traffic has been seriously hindered. The factories and roundhouses responsible for repairs should not bear the smallest part of the blame for this condition. Their numerous strikes and reduced working efficiency have made it impossible during the last few weeks to accomplish the absolutely necessary work that the changed conditions have brought about. The rolling stock on hand is still further reduced through the necessities of demobilization. To date it has been possible to furnish only 57 trains to return the Western Army from the front and 16 trains for the Eastern Army.

To this we must add the demands made by the Allies. To start with, they require that we return between 20,000 and 25,000 prisoners daily, which will require no less than 14 trains. Then they require the immediate delivery of 5,000 locomotives and 150,000 cars. This was the original demand, which was made even more severe after the conclusion of the armistice. The Entente now demands that 2,000 locomotives be of the heaviest type, 2,000 of heavy type, and 1,000 of a light type, and that the cars include 15,000 passenger cars, 6,500 baggage cars, 60,000 open gondolas, 40,000 covered freight cars and 28,500 cars of a special type.

Confiscated Rolling Stock

The following figures covering confiscated rolling stock prove conclusively that the Allies' demands are far greater than what we secured from enemy countries. From the Belgian railway system, the heaviest type of locomotives comprise only about 9.5 per cent of the total. Among the captured French and Belgian locomotives only 230—that is, 11.3 per cent—were of the heavier type. Among the German locomotives on hand, including those left in Belgium, we figure about 13,500; deducting 40 per cent as unfit for service, there are 8,100 available.

Our booty in Belgian and French railway cars is approximately 100,000 cars, including 9,000 passenger and

baggage cars and 71,000 open and 20,000 covered freight cars. The Allies demand the delivery of 150,000 cars, including 88,500 of the open or of a special type and 40,000 covered. Thus we lose 50,000 more than we confiscated. Herewith it is to be noticed that German freight cars usually have a much larger tonnage than the Belgian. In 1912 only about 45 per cent of Belgian cars possessed a tonnage capacity of 15 tons or more, whereas 85 per cent of German cars have this capacity.

DELIVERY OF EQUIPMENT TO ALLIES

The period set for delivery—that is, the 11th of December—has not been followed. It has become evident that the recent inquiries from the Entente regarding the prompt delivery of this rolling stock does not constitute an ultimatum. The German Armistice Commission has in fact made a counter proposition that will be considered in the new armistice negotiations. It is to be noticed that a not inconsiderable proportion of the rolling stock to be delivered is already in the hands of the Allies, as Germany left no less than 3,000 locomotives and 100,000 cars in the districts since occupied. According to the original demands of the Entente, we would have to deliver 2,000 locomotives and 50,000 cars in 10 days. Such an achievement of transportation, simultaneously with the return of the troops from the western front, would certainly have led to a stoppage of railway traffic to the districts in question. The new negotiations over the extension of the armistice are giving opportunities to get easier terms in the question of delivery.

REPAIRS NECESSARY—FURTHER REDUCTION IN TRAFFIC

According to the new armistice terms, the period for delivery of the locomotives and cars expires on the 16th of January. In the next 10 days 1,000 must be delivered; that is, 100 daily. The delivery of the freight cars also causes extraordinary difficulty. In the next few days 48 full trains must be turned over. This figure becomes 70 very soon. In addition to this, the Allies have shown themselves extremely strict in this proposition and positively refuse to accept anything not in perfect condition. Hence the railway management is forced to turn practically the entire rolling stock to the repair shops to have them put in fit condition to meet the requirements.

It is already customary to work in three shifts in both the railway and private shops. Under these circumstances, it seems absolutely certain that we will not be able to avoid a further reduction in military and passenger traffic. From now on the return of troops will be much slower, owing to the missing rolling stock. The Railway Ministry has instructed all branches to reduce present traffic 50 per cent. The manner of fulfilling this instruction is left to the discretion of the branches. Furthermore, hereafter no one may use the railways without a travel permit. It has not been considered advisable to enforce this restriction in the city of Berlin, but it may still be necessary to insist upon a travel permit even there. At present it seems impossible to make any further saving in freight traffic, inasmuch as it is doing practically nothing but transporting coal and provisions, but one must figure upon having postal matters delayed still more in the future.

An Important Bridge Project in Uruguay

Among the recommendations voted by the Fifteenth Annual Rural Congress of Uruguay, writes Consul William Dawson from Montevideo, was one providing for the building of three bridges, the most important of these being that over the bar of the Santa Lucia river in the vicinity of Montevideo. The width of the river at the point to be bridged is some 500 meters (1,640 feet).

The bridge, which would place the southern part of the Department of San José in easy communication with Montevideo and give new life to the state-owned Ferrocarril del Norte, has been under consideration for a number of years. Some time before the war a definite project was drawn up and contracts for the building of the bridge were let. About $400,000 was expended in the erection of the pillars, the work being done by a Montevideo firm. The superstructure was contracted for with a German firm, which was unable to secure shipment of its materials on account of the war. This contract has since been canceled by the Uruguayan government.

The consulate is informed that no decision has been taken with respect to a second call for tenders and that it is not known whether such a call would be based on the original or new specifications. Copies of the plans used for the first call may be obtained from the Dirección de Vialidad, Ministerio de Obras Publicas, Montevideo, at a cost of 3.50 pesos ($3.62).

Electric Railway Projected from Stockholm to Goteborg

Electrification of all the principal railroads of Sweden is most logical in view of the dearth of coal and the wealth of water power, writes Commercial Attaché Erwin W. Thompson, Copenhagen, Denmark. The plan recently discussed in the Danish press for an electric road connecting Goteborg and Stockholm, is most timely. Goteborg has many advantages as a port for the unloading of freight from the Atlantic, but Stockholm is a more advantageous center for the distribution of foreign goods. The proposed railway should therefore be of advantage to both cities. The following comment on the project appeared in the Berlingske Tidende (Copenhagen) for February 11:

As economic life in the neutral northern countries resumes normal conditions efforts from all sides are directed toward becoming fully equipped for the enormous boom in commerce and traffic which is prophesied for all tncse countries. The American plans for making Copenhagen the center of food distribution to the hungry Baltic States have enhanced the expectations. Sweden has great chances for transit traffic in a new big north European main route. An important link in this work is the great plan for building a new electric express from Stockholm to Goteborg, at the nead of which is the well-known Swedish traffic expert, Hjalmar Cassel. The present route is old and inadequate, and Mr. Cassel claims that the time is ripe for building a new railway. This would not only take care of the transit traffic between England and Finland-Russia and the express traffic from Stockholm to Goteborg and from Stockholm to Christiania, but also the express traffic south to Denmark and the Continent, and between Denmark, the Continent, and Norway. The new route would mean a considerably quicker connection between Sweden and Finland, Denmark and Norway. This would be of greatest importance in the general scheme for Scandinavian co-operation.

Mexican Government Proposes to Purchase Yucatan Railways

According to advices from Merida, the proposition of the Carranza government to purchase a controlling interest in the United Railways of Yucatan is received unfavorably by several of the larger stockholders of that company. It is considered doubtful if the plan of taking over the property by the government is put through. The system embraces 1,141 miles of road, including many branch lines that gridiron a considerable portion of the more developed parts of Yucatan. Besides affording a direct rail connection from the sea at Progreso to Merida, the chief city, it has a line running south to Campeche, 107 miles. It also extends into the territory of Quintana Roo, which was created out of Yucatan during the administration of the late President Diaz. The United Railways of Yucatan are owned by a syndicate of bankers and sisal fibre growers of Merida.

The announced plan of the Carranza government of constructing a standard gage railroad from Santa Lucrecia, on the National Tehuantepec Railroad, to Campeche, about 450 miles, is the same project which was promoted by a British syndicate eight years ago. The revolutionary troubles put a stop to the scheme. The route of the proposed line is through one of the richest and most remote parts of tropical Mexico.

Notwithstanding the revolutionary disturbances, the con-

struction of a 25-mile railroad from La Capilla, on the Guadalajara-Irapuato division of the National Railways of Mexico, to Lake Chapala has been accomplished. The road was recently opened for regular freight and passenger traffic. It affords a direct rail outlet for one of the most delightful pleasure and health resorts in Mexico.

After a long period of suspension traffic has been resumed on the Guadalajara-Manzanillo line of the National Railways of Mexico. Temporary repairs have been made to the track, bridges and other parts of the road and a large amount of permanent reconstruction work will be done as soon as the materials can be obtained, it is stated. The federal government plans to make important improvements to the port facilities at Manzanillo. In order to develop the transcontinental traffic between Manzanillo and Tampico low freight rates will be established. The line that runs from Guadalajara to Manzanillo was originally a part of the old Mexican Central system.

Railways in Morocco

The study of the Tangier-Fez Railway scheme was suspended at the outbreak of the war, says a recent issue of the Near East, as quoted in Commerce Reports, but lately the project has been taken up again, the plans, etc., have been proceeded with, and actual work has commenced on some sections in the French zone. The construction of the line will presumably be proceeded with as quickly as possible.

The public works in progress in the Spanish zone on the outbreak of the war were harbor works at Laraiche and a railway between that port and Alcazar, both of them in the hands of a German company. The former has been handed over to the Spanish authorities in an incomplete state, and the work on the railway has been practically at a standstill for some time. This railway, as also the Spanish zone section of the Tangier-Fez Railway, with which it will connect, will presumably be pushed on when circumstances permit. A light railway has been built connecting Centa with Tetuan, and a line to join up the latter place with the Tangier-Fez railway is contemplated, but it is not likely to be taken in hand for some time.

Russian Railway Paralysis

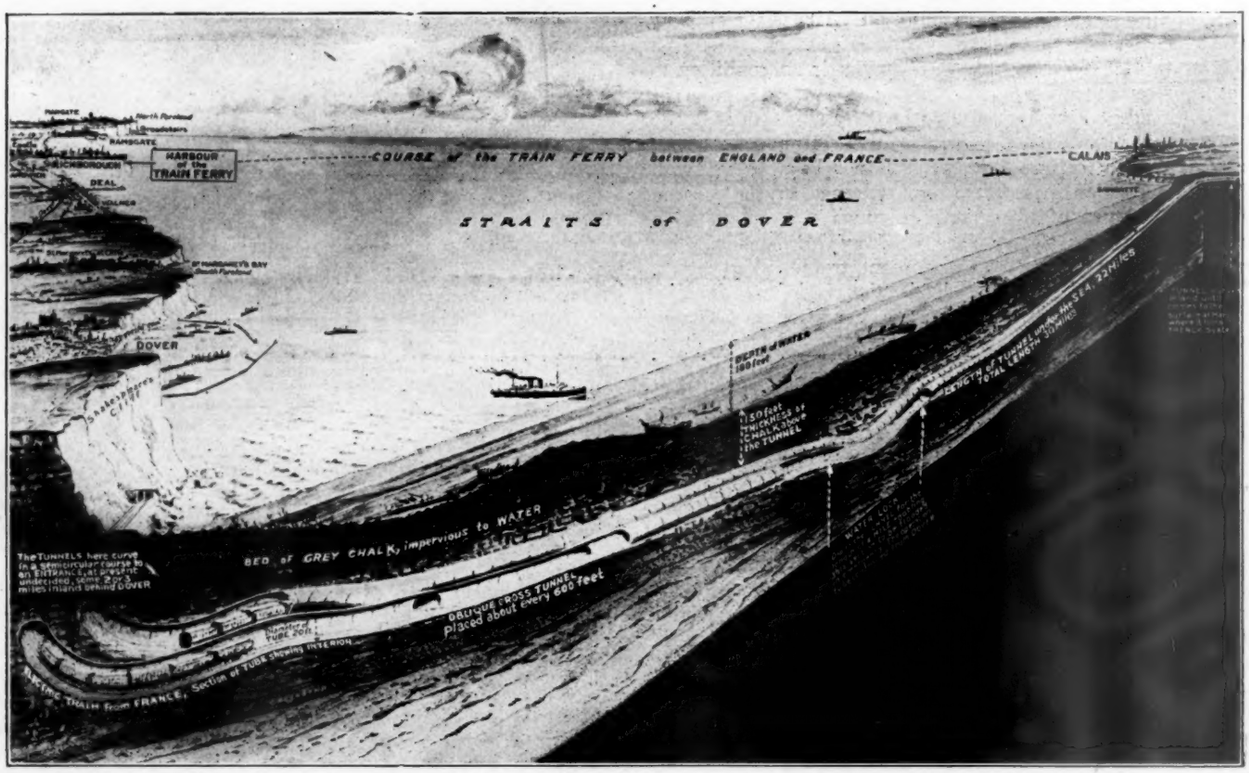
The paralysis of railway communications in the whole of Central and Northern Russia, it is officially admitted in Moscow, is rapidly approaching, writes a correspondent in the Times (London) from Helsingfors, under date of March 5.

The principal cause seems to be the lack of fuel, and then the dearth of skilled workmen for the repair of locomotives, and the huge masses of snow which have accumulated during the winter. From February 26 to March 1 only one passenger train arrived at Moscow from Petrograd, carrying exclusively Bolshevist delegates. On the Moscow-Kursk-Kharkov line many trains have been snowed up for 1 days. The official Severnaya Kommuna publishes an urgent order of the Soviet mobilizing all peasants up to the age of 55 exclusively for obligatory service on the railways.

Exports of Railway Supplies Through New York

Exports of railway material from the port of New York, during February, according to figures of exports compiled by the National City Bank of New York included the following:

Steam passenger cars	$40,708
Steam freight cars	211,151
Car wheels and axles	165,771
Steam locomotives	1,990,171
Railroad spikes	216,497
Steel rails	3,178,224
Switches, frogs, etc	445,933


HARBOUR of the TRAIN FERRY
COURSE of the TRAIN FERRY between ENGLAND and FRANCE
CALAIS
STRAITS of DOVER
DOVER
BED of GREY CHALK, impervious to WATER
OBLIQUE CROSS TUNNELS placed about every 600 feet

Copyright by Underwood & Underwood, N. Y.

A Cross Section of the Proposed English Channel Tunnel

Professional Engineers Given Hearing

THE NEED FOR A CLASSIFICATION and standardization of conditions and salaries for railroad professional engineers was urged by representatives of the American Association of Engineers and the Engineering Council at a hearing before the Board of Wages and Working Conditions of the Railroad Administration at Washington on March 31 and April 1 and 2. The American Association of Engineers, represented by C. E. Drayer, secretary, presented the resolutions and schedule of salaries for engineers adopted at the Chicago conference on March 17, which were published in the *Daily Railway Age* of March 18, and also the following argument in support of its position:

"Two illustrations are mentioned for the purpose of making plain the need. From questionnaires recently sent out, the American Association of Engineers finds that three roads are paying instrumentmen $105 a month, while several other roads are paying the same class of help from $165 to $175 per month. An instrumentman on the Pennsylvania Railroad is doing resident engineer's work, consisting of the construction of engine terminal and is receiving instrumentman's pay.

"The benefits to be derived from classification and standardization are: 1. Elimination of the discrimination that exists between engineers in railroad service. 2. It will permit re-adjustment of salaries and working conditions on a definite and sound basis.

"It is admitted by all that there should be certain definite relations in pay among men who are doing the same kind of work; that there should be certain definite standards whereby a man who is qualified to perform a certain kind of work and does, should receive a certain pay.

"We find on the different roads, from the 1,200 questionnaires sent out and received last week from 60 different roads, that men doing precisely the same kind of work are being paid salaries differing by large percentages.

"The following principles should govern in classification and standardization of positions and salaries: 1. Standard and distinctive details of all positions having similar conditions and working requirements. 2. Definitions of duties and responsibilities of each position. 3. Definitions of classifications and requirements of each position. 4. Placing of positions into classification according to the character of duties and according to responsibility and division of work. 5. Positions of the same kind, made distinctive according to duties and responsibilities, should carry the same rate of pay.

"In view of the data submitted by the American association at this hearing showing lack of uniformity of rates being paid to engineers in railroad service;

"In view of the testimony as to lack of proper consideration of engineers as a class in any of the orders heretofore issued by the board;

"In view of the evidence introduced as to the desirability of defining and standardizing titles and positions,

"We respectfully ask the Board of Wages and Working Conditions to make a thorough investigation of the pay and working conditions of employee engineers of all classes, civil, mechanical, electrical, signal, testing and any others in order that exact justice shall be done.

"We ask that age, seniority, responsibility and ability be given consideration in determining a schedule of wages and in establishing rules governing promotion.

"We ask that the American Association of Engineers be given an opportunity to be represented in the final study of data and in the preparation of the schedule of wages and rules of promotion.

"We ask that a decision be reached as speedily as possible and that the new schedule of wages be made retroactive in the discretion of the board."

The following was also presented on behalf of the Engineering Council by Francis Lee Stuart and Frank H. Clark, of the Railroad Section Committee on Classification and Compensation of Engineers:

"Engineering Council is an organization of national technical societies of America, created to provide for consideration of matters of common concern to engineers, as well as those of public welfare in which the profession is interested, in order that united action may be made possible. The present member societies are the American Society of Civil Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers and American Society for Testing Materials, representing some 40,000 members. A large number of the members of council's constituent societies are directly or indirectly connected with the transportation system of the country.

"Engineering Council has been advised: first—that engineers and engineering assistants of the more important classes on the railroads have been individually considered as belonging to the officer or supervisory force and certain increases of salary have been granted them by the Railroad Administration; second—that the men in subordinate positions in the civil, mechanical, electrical and signal departments not included in the above class, while not having been given a classification, have been granted certain increases under Order No. 27—Supplements 7 and 8.

"The Engineering Council through this committee desires to express to your board its belief that it is to the best interest both for the social and economic welfare of the railroad professional engineers of the United States that the case of these younger engineers or engineers holding these subordinate positions be further considered.

"Before the war the compensation of the engineers was notably inadequate and the increases which have been granted the men in the subordinate positions do not seem to them sufficient. Engineering Council, through this committee, asks that the employees of the engineering departments—civil, mechanical, electrical and signal, who were not considered in the officer or supervisory force, but who will, from their technical education or training, at some later date occupy the higher positions in these departments, be given a classification and the titles of these positions standardized, and a proper remuneration be given them in order that their physical welfare and mental interest may be provided for so as to insure efficient service to the public.

"The members of the founder societies of Engineering Council have occupied these identical positions in their day and hence speak to you from experience, but we recognize that Engineering Council has not the direct touch with these younger engineers employed by the railroads of the country, to handle the details of the matter in the way you may desire and we are therefore further requesting that your board have the necessary data collected and considered so that it may be certain that this particular class of employee has been treated with justice comparable with other classes of employees who have been given separate classification in the railroad service.

"Associated with Engineering Council in this hearing is the American Association of Engineers, a national engineering organization which includes in its membership a large proportion of the younger engineers in railway service who occupy subordinate positions. The American Association of Engineers has held a conference of railway engineers to consider wage matters, and comes before you with the direct support of the larger proportion of railway engineers in the country."

The clause in the resolutions against overtime pay for supervisory engineers was the subject of considerable discussion. H. E. Stevens, chief engineer of the Northern Pacific, testified regarding conditions in the railroad engineering field as a representative of the northwestern regional director.

General News Department

Pittsburgh to New York, 411 miles, in 11 hours, 20 minutes, is an automobile record recently reported. It was made by J. M. Sterling in a Marmon 34 touring car. The average rate is 36.28 miles an hour.

The transportation conference called by the Railroad Committee of the Chamber of Commerce of the United States is to hold its final session at Washington on April 17, at which resolutions will be adopted for presentation at the annual meeting of the Chamber. The conference has already gone on record as favoring the return of the railroads to their owners.

The Interstate Commerce Commission on Thursday issued a modification of some of its rules for the inspection and testing of locomotives, restoring, effective May 1, some of the changes made in September, 1917, to assist carriers in meeting war conditions, but making permanent until otherwise ordered, some of the modifications then made which experience has shown may be retained without adversely affecting safety.

Train robbers stopped St. Louis-San Francisco passenger train No. 801 two miles west of Bridge Junction, Ark., on March 27, and forced the express messenger to open a safe from which they obtained about $6,000. The robbers uncoupled the baggage car and mail coach from the remainder of the train and ran some distance toward Memphis. Then the express messenger and his assistant were forced to turn over currency which they had in the car, and the two bandits got away.

Portable ticket cases are now in use at the Grand Central Terminal, New York City—large cases, each with room for all of the forms used at that station, mounted on casters so that they can be moved from one window to another. This office carries about 3,000 forms and under ordinary arrangements the ticket sellers have to do a large amount of walking from one case to another. In the new cases all very long tickets are folded so as to occupy the minimum amount of space. Each clerk, having a case assigned to his individual use, is provided not only with all forms of railroad tickets but also with Pullman tickets. The standard case, when shut up, is 3 ft. 9 in. wide, 2 ft. deep and 7 ft. high. By making all tickets with stubs, so as to simplify the accounting, one case is used, where necessary or desirable, by two sellers simultaneously. The simplification of the seller's work by the use of these cases has greatly relieved congestion at the ticket windows. The New York Central uses at the Grand Central Terminal 13 ticket windows.

Western Railway Club Will Discuss Electrification

The April meeting of the Western Railway Club will be held at the Hotel Sherman, Chicago, on April 21. W. B. Potter, chief engineer of the Railway and Traction Engineering Department of the General Electric Company, and S. T. Dodd, also of that department, will present a paper on the Electrification of Trunk Line Railroads. The meeting will be held in the Louis XVI room at 8 p. m. and will be preceded by a dinner in the Italian room at 6:30 p. m.

Pacific Railway Club

The April meeting of the Pacific Railway Club was held on the 10th at Oakland, Cal. The transportation of perishable freight was discussed. W. C. Phillips, general superintendent of ice plants of the Pacific Fruit Express, spoke on the production of ice and the icing of refrigerator cars; L. L. Yates, on the construction and maintenance of refrigerator cars; H. Giddings, on the transportation of perishable products; F. B. McKevit, on the assembling and shipment of fruit, and S. M. Fulton, on fruit train schedules.

National Chamber Asks New Trust Legislation

Reconsideration by Congress of all anti-trust legislation is recommended by the Chamber of Commerce of the United States as the result of a referendum vote. The membership of the chamber voted in favor of all of the four proposals advanced: (1) Congress should be asked immediately to consider the present situation of all statutes constituting our anti-trust legislation—for, 1,543; against, 51. (2) In reconsideration of existing legislation there should be formulation of standards of general business conduct, these to be administered by a supervisory body—for, 1,159; against, 389. (3) An enlarged federal trade commission should be made the supervisory body—for, 1,102; against, 437. (4) The membership of the federal trade commission should be increased to nine—for, 1,104; against, 422.

Double Tracking on the Big Four

It was erroneously reported in our issue of March 21, page 781, that 300 workmen engaged in laying a second track on the Cleveland, Cincinnati, Chicago & St. Louis, near Winchester, Ind., had been dismissed by the contractors because the Railroad Administration had held up the appropriation for the work. We are officially advised that if any workmen were dismissed it was because their part of the work had been completed. The work has proceeded without interruption and grading for the second track between Winchester and Union City is over 90 per cent completed and the track is actually in service except for a short distance. Beyond Union City and between that point and Ansonia, grading is about 60 per cent completed and track laying almost entirely completed.

Convention of Master Tinners', Coppersmiths' and Pipefitters' Association

The American Railroad Master Tinners', Coppersmiths' & Pipefitters' Association has announced that the next annual convention will be held on June 2, 3, 4 and 5, 1919, at the Marquette hotel, St. Louis, Mo. The officers of the association are: President, W. J. Moffett (N. Y. C.); first vice-president, G. B. Hosford (M. P.); second vice-president, W. W. Nash (I. C.); third vice-president, T. E. Holderby (C. & O.); secretary-treasurer, O. E. Schlink (C. & O. of Ind.).

Thirteenth Engineers Commended

The enviable record made by the 13th Engineers (railway) in France has earned for this regiment the following letter of commendation issued by Brigadier General Moseley, assistant chief of staff, at the order of General Pershing, commander-in-chief of the American Expeditionary Forces.

The letter says:

"Official report has just been received at these headquarters of the decorations and citations awarded you with the approval of the French High Command by the Commanders of the French Armies, Army Corps, Divisions, Brigades and Regiments under whom your regiment has served during its tour of duty in France. It is very gratifying to know that the efficient service of your regiment has been so recognized and rewarded.

"At the request of the French Government, presented in the spring of 1917, your regiment was organized at an early date and under the most favorable auspices. By reason of the great number of men who presented themselves for service in France and the selection which was thereby made possible, the character and qualifications of the officers and men composing the 13th Engineers were such as to make it a true representative of the very highest type of railway personnel in the United States.

"It was your good fortune to come to France in the formative

period of the American Expeditionary Forces, and you were at once placed on duty with the French Armies in the sector of Verdun—a name which is the apotheosis of the glory and honor of France. Here you took up the task of transporting men, material and supplies to our Allies under conditions of service utterly unlike anything in your previous experience. Railway equipment and methods of operations were entirely new to you, and the situation was made still more difficult by the lack of common language.

"The cheerfulness, the adaptability, the loyalty and the self-sacrificing devotion to duty, uniformly displayed under these trying circumstances by the officers and men from the regimental commander to the most recently arrived private, have added a new luster to the traditions of our railway service.

"I therefore take advantage of this occasion to express to you, and through you to the officers and men of your command, our high appreciation not only of the valuable service rendered by them, but for the great assistance they have been to one of our allies. As a token of its appreciation for these services, the military authorities of the French Republic have awarded you these decorations. These medals and citations should be more highly prized by you when you realize that in receiving them, you have won at the same time the real appreciation and gratitude of the French military authorities under whom you have served.

"By order of Commander-in-Chief,

"(Signed) GEORGE VAN HORN MOSELEY,
"Brigadier General, G. S.,
"Assistant Chief of Staff, G-4."

On February 22, 1919, thirty-one officers and men of the 13th Engineers were awarded the Croix-de-Guerre. The decorations were presented at Simmeilles-Nettencourt by Colonel Boquet, Director General of Military Transports of the French armies. in bestowing the decorations upon the engineers, Colonel Boquet said in part:

"I am very happy to have been directed to hand today the Croix-de-Guerre, which it has been Marshal Petain's good-will to award some of you in accordance with the proposals made by Lieut. Colonel Marchand, Military Commissaire of the Eastern Railroad, and myself.

"These rewards you fully deserve for the untiring zeal and devotion you have shown. . . . I have known the 13th Regiment of American Engineers ever since their arrival in France. I have constantly watched their work and efforts, and I have, better than anyone else, been in a position to appreciate their valor and good spirit."

Those to whom the decoration was presented were:

Colonel N. L. Howard, formerly division superintendent on the Chicago, Burlington & Quincy, at Hannibal, Mo.
Lt. Col. C. E. Whiting, formerly division superintendent on the Chicago, Milwaukee & St. Paul, at Lewistown, Mont.
Major E. Schultz, formerly division master mechanic on the Chicago & North Western, at Chicago.
Captain W. Haberlaw, formerly roadmaster on the Chicago, Rock Island & Pacific, at Rock Island, Ill.
Captain J. W. Kern, formerly supervisor on the Illinois Central at Mounds, Ill.
Lieut. Hugh MacKee.
Lieut. H. Halverson, formerly roadmaster on the Chicago & North Western at Eagle Grove, Iowa.
Lieut. E. E. Deyo, formerly yardmaster on the Chicago Great Western at Oelwein, Iowa.
Lieu. R. Harrisson.
Lieut. L. A. Weary.
Master Engr. F. Williams.
Master Engr. B. Berryhill.
Sergeant L. Face.
Sergeant O. Olsen.
Sergeant H. Lightner.
Sergeant Thomas J. Ross.
Sergeant J. E. Morrel.
Sergeant W. N. MacMahon.
Sergeant A. G. Crozier.
Sergeant W. Dreasher.
Corporal C. T. Barnes.
Corporal W. Lish.
Lorporal W. T. Mott.
Corporal M. H. Bootjer.
Private D. C. Steinmeyer.
Private V. Nicholls.
Private G. Tichy.
Private F. Bitte.
Private E. Vondeveld.
Private W. B. Muller.

Revenues and Expenses for February

Net operating income of the class I roads and 18 switching and terminal companies, as reported by the Interstate Commerce Commission for February, amounted to $10,106,268, as compared with $11,877,297 in February, 1918, and about $47,000,000 in the three-year test period. Operating revenues were $351,946,353, as compared with $290,021,416 in February, 1918; operating expenses were $324,520,617, as compared with $261,344,313; tax accruals were $14,938,289, as compared with $14,498,480, and railway operating income was $12,429,102, as compared with $14,132,407. For the two months, January and February, the net operating income was $28,835,957, as compared with $7,775,227 last year, but about $102,000,000 for the test period.

The eastern railroads for the two months had a deficit of $2,387,383, as compared with a deficit of $34,060,687 in 1918; the southern roads had net operating income of $8,632,827, against $15,360,218, and the western roads $22,590,513, against $26,475,696.

The details, as reported by the Commission, are shown in the double-column table.

RAILWAY REVENUES AND EXPENSES

Item	February				January and February			
	Amount		Per mile of road operated		Amount		Per mile of road operated	
	1919	1918	1919	1918	1919	1918	1919	1918
Average number miles operated	233,045.53	233,499.87	...	...	233,025.28	233,538.73	...	...
REVENUES:	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Freight	241,889,005	198,583,302	1,038	850	519,860,486	387,379,649	2,231	1,659
Passenger	79,115,183	62,294,450	339	267	165,967,004	128,788,320	712	552
Mail	4,165,053	4,382,556	18	19	8,511,096	8,957,445	36	38
Express	7,809,266	9,040,642	34	39	14,144,646	17,837,973	61	76
All other transportation	8,619,895	7,975,660	37	34	18,073,008	15,582,553	77	67
Incidental	9,946,354	7,453,027	43	32	21,423,885	16,330,166	92	70
Joint facility—Cr.	538,520	418,623	2	2	1,119,387	808,471	5	3
Joint facility—Dr.	136,928	126,844	1	1	300,162	250,611	1	1
Railway operating revenues	351,946,353	290,021,416	1,510	1,242	748,798.750	575,433,966	3,213	2,464
EXPENSES:								
Maintenance of way and structures	54,101,638	38,923,338	232	167	112,403,862	79,811,134	482	342
Maintenance of equipment	89,882,609	66,620,506	386	285	189,460,237	133,849,265	813	573
Traffic	3,557,993	4,574,618	15	20	7,050,462	9,493,232	30	41
Transportation	163,919,766	140,524,210	703	602	349,690,296	288,039,127	1,501	1,233
Miscellaneous operations	3,364,093	2,692,722	15	11	6,971,635	5,673,612	30	24
General	10,187,065	8,480,310	44	36	20,417,056	16,949,397	88	73
Transportation for investment—Cr.	492,547	471,391	2	2	893,324	893,679	4	4
Railway operating expenses	324,520,617	261,344,313	1,393	1,119	685,100,224	532,922,088	2,940	2,282
Net revenue from railway operations	27,425,736	28,677,103	117	123	63,698,526	42,511,878	273	182
Railway tax accruals (excluding "War Taxes")	14,938,289	14,498,480	64	62	30,269,147	29,284,494	130	126
Uncollectible railway revenues	58,345	46,216	...	...	116,400	89,031	...	...
Railway operating income	12,429,102	14,132,407	53	61	33,312,979	13,138,353	143	56
Equipment rents	*1,409,454	*1,154,252	*6	*5	*2,235,183	*3,100,857	*9	*13
Joint facility rents (Dr. Balance)	913,380	1,100,858	4	5	2,241,839	2,262,269	10	10
Net of Items 22, 23, and 24	10,106,268	11,877,297	43	51	28,835,957	7,775,227	124	33
Ratio of operating expenses to operating revenues	92.21	90.11	...	...	91.49	92.61	...	...

* Debit item.

REVENUES AND EXPENSES OF RAILWAYS

Month of January, 1919

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Virginian	518	$829,661	$52,617	$957,410	$195,738	$239,406	$6,878	$414,705	$16,136	$859,452	89.76	$97,958	$35,200	$62,758	—$23,733
Wabash	2,519	2,729,812	717,356	3,741,718	512,156	734,610	49,200	2,159,224	111,321	3,584,205	95.79	157,513	96,429	60,858	482,823
Washington Southern	35	153,514	240,078	446,806	31,040	33,052	2,933	125,587	5,517	199,392	44.62	247,414	7,136	240,278	140,882
West Jersey & Seashore	359	299,000	367,356	735,887	220,906	193,255	7,014	480,036	20,870	926,064	125.84	—190,177	40,063	—230,433	29,999
Western Maryland	707	1,153,735	77,413	1,331,668	298,495	434,666	23,136	668,446	42,220	1,478,020	110.99	—146,352	43,200	—189,551	—98,629
Western Pacific	1,011	753,237	83,295	870,857	209,332	159,535	13,290	307,236	20,452	724,061	83.14	146,797	37,016	109,770	—133,460
Western Ry. of Alabama	133	137,849	72,518	225,899	29,398	48,277	2,944	99,676	7,092	190,699	84.41	32,974	7,500	25,474	—21,126
Wheeling & Lake Erie	511	670,085	43,373	779,417	164,267	289,175	6,325	403,663	28,110	893,220	114.60	—113,803	56,300	—170,103	—88,109
Yazoo & Mississippi Valley	1,382	1,337,913	469,610	1,860,167	299,621	416,107	11,428	783,941	53,183	1,568,215	84.30	291,952	68,066	223,823	—84,414
Wichita Falls & Northwestern	328	92,789	32,321	131,655	35,078	20,871	587	70,914	6,339	133,790	101.62	—2,135	9,070	—11,258	—733

(c) Not operated.

MONTH OF FEBRUARY, 1919

Alabama & Vicks	141	144,611	50,366	206,985	37,581	51,421	1,260	101,912	8,304	201,709	97.49	5,185	11,217	—6,056	—26,731
Alabama Great Southern	312	553,617	145,969	735,517	91,803	222,914	12,271	357,874	18,092	703,744	95.67	31,773	24,561	7,205	—120,803
Ann Arbor	301	214,685	48,686	277,548	55,403	45,080	3,456	143,250	11,731	258,958	93.30	18,588	13,100	5,420	34,313
Arizona Eastern	377	268,506	50,063	336,887	72,480	54,614	1,527	99,374	3,726	242,831	72.08	94,055	16,282	77,738	—56,553
Atchison, Top. & Santa Fe	8,635	8,611,298	3,393,459	12,568,683	1,733,208	2,648,862	109,821	4,608,255	270,835	9,340,062	74.31	3,228,622	548,979	2,678,546	337,434
Atlanta & W. Point	93	111,119	88,481	217,638	27,009	39,909	2,835	82,371	6,532	162,259	74.55	55,379	8,500	46,879	6,135
Atlanta, Birmingham & Atl.	639	273,177	60,760	358,429	120,584	132,801	6,751	223,913	11,781	496,021	138.38	—137,592	16,000	—153,832	—160,301
Atlantic City	177	89,290	111,393	215,919	36,074	51,384	505	149,774	617	238,432	110.42	—22,513	12,000	—34,513	5,066
Atlantic Coast Line	4,839	2,946,727	1,693,599	4,959,225	769,025	1,001,179	60,375	2,160,934	104,717	4,131,285	83.30	827,940	200,000	626,247	—684,258
Baltimore & Ohio	5,145	7,974,132	2,218,747	11,228,986	2,100,985	4,356,676	146,519	6,179,545	391,670	13,269,919	118.17	—2,040,933	329,771	—371,310	—1,130,401
Baltimore & Ohio Chicago Term.	91	.....	.....	103,075	28,933	42,975	1,304	113,048	8,772	199,512	193.56	—96,437	31,876	—128,326	—31,252
Baltimore, Ches. & Atl.	87	61,324	24,180	88,963	8,987	15,826	1,919	62,561	3,274	91,566	102.92	—2,604	3,160	—5,764	—20,031
Bangor & Aroostook	632	338,061	59,915	419,074	99,571	110,194	2,854	176,864	13,521	408,027	97.36	11,047	21,000	—9,997	8,857
Beaumont, Sour Lake & Western	118	88,139	19,911	113,483	24,024	19,550	1,096	50,432	4,112	99,213	87.42	14,269	2,700	11,569	—33,114
Belt Ry. Co. of Chicago	31	.....	.....	219,450	27,183	51,003	359	154,247	7,830	240,621	109.64	—21,171	16,442	—37,614	—12,903
Bessemer & Lake Erie	217	578,138	31,913	625,530	81,000	285,995	13,878	275,601	18,081	655,153	104.73	—29,623	14,500	—44,124	3,624
Birmingham Southern	27	37,555	.....	57,972	3,908	6,399	622	27,829	3,364	42,122	72.65	15,850	4,337	11,513	7,857
Boston & Maine	2,258	2,572,076	1,443,985	4,462,979	593,256	1,060,349	36,678	2,780,290	159,972	4,654,525	104.29	—191,546	172,385	—363,932	23,001
Buff. & Susquehanna	296	154,371	6,756	164,286	39,372	73,640	1,846	60,550	7,255	182,664	111.18	—18,379	3,250	—21,628	—54,972
Buff., Rochester & Pitt.	589	916,582	114,265	1,067,602	141,768	403,574	13,603	539,293	32,891	1,133,267	106.15	—65,665	27,000	—92,965	—38,111
Brooklyn Eastern District	10	62,541	.....	68,352	16,054	28,179	28	50,035	3,824	98,118	143.54	—29,766	4,970	—34,736	—37,697
Canadian Pac. Lines in Maine	233	266,171	46,652	326,163	34,561	74,857	2,644	200,271	5,435	317,768	97.42	8,395	11,000	—2,605	56,853
Carolina, Clinchfield & Ohio	282	384,111	27,723	420,169	78,215	113,471	4,325	135,527	13,345	344,809	82.06	75,360	16,300	59,048	—36,084
Central of Ga.	1,918	915,251	480,967	1,546,001	321,456	361,337	27,154	696,160	58,138	1,461,962	94.56	84,040	22,625	61,302	—440,570
Central of New Jersey	684	2,204,986	516,826	3,002,683	359,568	1,064,039	22,514	1,625,258	83,914	3,166,530	105.45	—163,847	157,689	—321,711	—455,005
Central of New England	301	410,843	22,051	459,431	77,928	118,950	2,278	231,325	13,093	445,040	96.86	14,392	16,000	—1,609	702
Central Vermont	411	256,531	75,630	366,505	36,878	105,076	5,646	264,915	17,908	430,570	117.47	—64,065	17,400	—81,471	22,863
Charleston & Western Carolina	342	169,603	57,412	237,035	42,643	38,284	4,460	113,637	5,405	204,430	86.24	32,605	8,500	24,106	—27,469
Chicago & Alton	1,050	1,276,384	462,414	1,823,758	286,831	474,206	22,660	820,244	45,103	1,659,452	90.99	164,306	55,506	108,740	98,121
Chicago & Eastern Ill.	1,131	1,213,925	373,953	1,726,538	305,722	692,171	20,084	875,753	48,921	1,945,273	112.67	—218,735	79,500	—298,530	263,114
Chicago & Erie	269	683,132	59,837	804,897	96,385	138,316	11,159	430,742	32,452	711,505	88.39	93,392	47,465	45,908	122,124
Chicago & N. W.	8,090	5,899,923	2,379,883	9,063,485	1,175,790	2,297,688	52,199	4,610,413	246,926	8,450,004	93.23	613,482	475,000	138,105	464,288
Chicago, Burlington & Quincy	9,372	7,351,659	2,306,683	10,479,346	1,313,255	2,120,375	76,182	4,301,151	305,999	8,198,318	78.23	2,281,029	476,182	1,797,750	431,782
Chicago Great Western	1,496	1,084,172	419,668	1,611,063	167,674	408,248	30,802	733,653	42,970	1,394,719	86.57	216,344	68,024	148,214	52,101
Chesapeake & Ohio	2,488	3,516,304	1,002,315	4,796,049	887,909	1,283,424	36,861	2,111,883	113,232	4,464,889	93.10	331,160	166,841	161,992	—509,976
Chicago, Ind. & Lou.	657	597,220	179,479	857,079	134,399	200,938	11,702	332,089	22,119	707,615	82.56	149,464	32,501	116,822	75,444
Chicago Junction	12	.....	.....	251,631	74,867	33,213	133	223,932	9,437	341,582	135.74	—89,951	2,156	—92,106	—56,421
Chicago, Milwaukee & St. Paul	10,273	6,923,891	1,989,420	9,816,028	945,394	2,707,165	87,345	4,973,926	287,093	9,071,663	92.41	744,365	551,713	191,488	1,180,135
Chicago, Peoria & St. L.	247	84,846	22,324	113,707	37,307	56,382	2,764	75,189	9,994	181,635	159.73	—67,928	7,360	—75,288	—57,933
Chicago, Rock Island & Gulf	474	256,184	77,764	354,328	64,827	54,223	5,625	160,695	11,208	297,543	83.97	56,784	13,155	43,595	—40,745
Chicago, Rock Island & Pac.	7,731	5,033,803	2,046,559	7,503,341	1,265,665	1,949,180	88,177	3,539,171	196,152	7,076,096	94.31	427,245	353,327	73,569	—197,205
Chicago, St. Paul, Minn. & Omaha	1,749	1,204,178	520,155	1,853,156	190,342	353,454	21,904	940,772	56,739	1,578,905	85.20	274,251	99,369	174,860	108,897
Chicago, Terre Haute & S. E.	374	265,352	20,891	291,941	63,603	143,704	3,378	112,164	10,356	334,696	114.65	—42,755	14,500	—57,256	55,260
Cin., Indianapolis & Western	321	142,290	43,960	206,498	33,085	70,717	4,071	120,661	11,500	240,314	116.38	—33,817	10,243	—44,060	82,142
Cin., New Orleans & Tex. Pacific	337	948,456	281,598	1,294,901	175,353	418,158	22,969	494,325	35,450	1,146,422	88.53	148,480	39,000	109,457	96,110
Cin. Northern	251	173,520	16,089	194,769	39,974	48,884	2,334	69,983	4,543	165,738	85.09	29,031	8,000	21,028	9,776
Cleveland, Cin., Chic. & St. L.	2,395	3,445,636	1,108,102	4,970,524	711,427	1,149,258	66,834	2,035,605	90,687	4,088,227	82.24	882,297	185,000	695,658	223,702
Colorado & Southern	1,100	817,955	136,177	980,613	102,372	233,077	8,845	395,015	37,144	771,925	78.71	208,688	47,000	161,517	—80,078
Colorado & Wyoming	41	28,091	1,101	100,403	6,392	16,847	80	48,894	3,873	76,085	75.77	24,318	4,000	20,318	1,572
Cumberland Valley	163	290,919	58,210	374,408	104,062	98,821	6,629	202,931	10,673	423,567	113.12	—49,159	9,429	—58,592	—133,001
Delaware & Hudson Co.	868	1,954,293	168,567	2,273,580	362,717	753,806	17,669	1,148,323	110,274	2,425,782	106.69	—152,202	60,000	—216,942	378,401
Delaware, Lackawanna & Western	955	3,878,703	900,865	5,355,451	445,356	1,114,576	40,588	2,358,046	114,435	4,120,499	76.94	1,234,953	340,956	893,851	292,374
Denver & Rio Grande	2,640	1,603,530	368,022	2,103,300	231,522	711,639	13,091	829,008	70,699	1,884,609	89.60	218,691	100,000	118,384	—222,620
Denver & Salt Lake	255	140,903	17,182	165,244	45,653	89,662	680	114,769	4,609	255,373	154.54	—90,129	9,000	—99,131	—17,499
Detroit & Mackinac	381	71,352	23,320	103,665	16,808	36,627	2,886	57,119	12,880	126,321	121.85	—22,656	7,430	—30,086	—21,199
Detroit & Toledo Shore Line	61	159,585	.....	160,707	13,747	13,321	386	46,307	2,831	76,903	47.29	84,705	7,250	77,455	17,393
Detroit, Toledo & Ironton	457	250,136	10,758	283,782	82,871	115,288	2,443	129,751	11,319	341,672	120.39	—57,889	8,532	—66,436	60,025
Duluth & Iron Range	424	135,168	37,139	180,495	40,272	56,259	5,266	88,468	10,005	200,310	110.97	—19,814	10,536	—30,363	—72,293

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
Duluth & Iron Range	292	$94,262	$21,543	$123,439	$41,879	$89,909	$552	$123,585	$14,679	$270,598	219.21	—$147,160	$6,786	—$153,946	—$3,598
Duluth, Missabe & Northern	410	135,313	36,645	193,451	90,786	132,637	1,981	153,005	13,784	393,351	203.33	—199,901	10,914	—210,815	47,919
Duluth, South Shore & Atl	599	219,780	68,639	306,720	62,375	68,133	6,247	188,457	10,353	339,327	110.63	—32,607	19,000	—51,606	6,003
Duluth, Winnipeg & Pac	178	139,810	22,794	169,329	17,298	32,697	3,110	80,554	9,554	147,595	87.16	21,735	8,482	13,246	16,255
East St. Louis Connecting	3	.....	.....	93,522	12,303	29,497	308	61,917	3,071	107,097	114.51	—13,576	2,000	—15,574	5,095
El Paso & Southwestern Co	1,027	805,734	156,331	1,011,243	116,428	179,355	9,923	267,860	24,686	604,918	59.81	409,325	48,364	357,957	—169,647
Elgin, Joliet & Eastern	828	1,552,883	7	1,847,007	133,592	431,898	6,492	647,442	27,473	1,246,794	67.50	600,213	53,250	546,963	613,598
Erie	1,989	4,812,593	880,558	6,335,757	585,543	2,137,819	56,017	3,330,728	200,624	6,356,343	100.32	—20,586	236,897	—258,282	637,638
Florida East Coast	764	473,145	397,841	967,506	154,714	160,392	9,903	455,656	18,659	809,250	83.64	158,257	38,827	119,433	—236,812
Ft. Smith & Western	253	79,125	22,893	111,124	21,695	26,345	3,519	43,477	6,077	101,363	91.22	9,762	5,000	4,762	1,567
Ft. Worth & Denver City	454	597,791	216,496	844,760	104,674	163,967	7,673	314,801	27,790	621,155	73.53	223,604	19,250	204,352	90,797
Ft. Worth & Rio Grande	235	57,326	41,760	105,324	28,835	29,221	626	70,826	5,451	134,959	128.13	—29,635	3,358	—33,190	—60,871
Fonda, Johnstown & Gloversville R. R	88	18,696	57,826	80,378	8,956	8,856	402	34,681	4,569	57,465	71.49	22,914	4,900	18,014	—4,257
Galveston, Harrisburgh & Santa Ant	1,382	1,108,214	397,143	1,570,017	241,728	250,169	20,226	751,874	53,213	1,428,365	90.97	141,652	52,205	89,363	—392,833
Galveston Wharf	13	.....	.....	51,911	11,588	1,002	25	19,681	865	39,761	76.59	12,150	11,400	750	—10,813
Georgia	328	305,166	121,587	463,250	56,623	79,362	6,773	225,836	18,244	387,035	83.54	76,214	5,950	70,263	—65,644
Georgia & Florida	348	55,745	16,591	76,622	25,203	18,439	2,061	45,180	4,676	95,559	124.71	—18,937	4,200	—23,161	—33,539
Georgia, Southern Florida	402	228,738	107,488	366,517	5,943	78,635	5,096	159,027	9,538	312,213	85.18	54,304	13,500	40,699	16,962
Grand Rapids & Indiana	569	377,464	104,189	531,477	97,959	129,727	9,593	277,965	22,848	539,590	101.53	—8,114	25,951	—34,065	—14,324
Grand Trunk Eastern Lines	1.002	1,040,720	152,685	1,329,472	198,622	222,023	15,760	719,974	44,307	1,207,444	90.82	122,028	50,874	70,832	487,742
Grand Trunk Lines in N. Eng	172	234,865	32,586	315,993	97,859	55,640	2,831	205,556	16,643	402,238	127.29	—91,246	11,500	—102,746	34,161
Great Northern	8,252	4,375,254	1,243,972	6,209,835	1,029,871	1,353,623	46,303	3,180,147	145,319	5,836,932	93.99	372,903	489,078	—116,638	458,678
Gulf & Ship Island	307	112,158	38,413	168,300	55,747	33,881	3,351	74,762	8,857	176,940	105.13	8,840	6,661	—15,514	—59,515
Gulf, Colorado & Santa Fe	1,937	982,718	354,523	1,418,517	252,028	187,840	10,351	634,589	40,975	1,125,649	79.35	292,868	71,168	220,465	—113,254
Gulf, Mobile & Northern	424	135,168	37,138	180,495	40,272	56,259	3,266	88,468	10,005	200,310	110.98	—19,814	10,536	—30,363	—72,293
Hocking Valley	350	327,707	79,654	441,056	90,061	270,818	5,900	219,632	20,376	606,221	137.44	—165,165	57,067	—226,395	—181,789
Houston, East & West Texas	190	130,462	36,745	173,060	32,082	34,990	998	80,380	4,137	152,585	88.16	20,475	6,160	14,252	—35,589
Houston & Texas Central	856	426,948	159,524	608,835	127,220	132,647	6,346	277,710	18,407	561,180	92.17	47,655	34,024	13,434	—147,381
Illinois Central	4,782	5,487,671	1,796,091	7,925,216	1,471,834	2,206,978	69,942	3,293,188	226,837	7,245,437	91.42	679,779	424,003	255,310	—702,492
Indiana Harbor Belt	116	.....	.....	445,743	83,445	128,421	1,807	305,848	16,256	535,777	120.19	—90,034	10,104	—100.138	8,432
International & Great Northern	1,159	723,291	233,151	1,029,126	271,197	322,757	11,810	516,973	31,099	1,160,035	112.72	—130,627	30,000	—161,057	—357,403
Kanawha & Michigan	176	158,681	53,171	221,829	43,335	129,482	2,394	108,351	12,571	296,133	133.49	—74,305	17,885	—92,190	—101,977
Kansas City, Mexico & Orient	272	54,291	13,856	72,679	27,094	38,637	656	54,830	8,004	129,220	177.79	—56,541	6,250	—62,791	—29,254
Kansas City, Mexico & Orient of Tex	465	54,682	8,146	67,786	30,063	39,664	552	70,671	7,038	147,986	218.31	—80,201	5,000	—85,201	—74,725
Kansas City Southern	774	887,708	166,344	1,134,305	217,359	268,554	14,797	488,397	44,627	1,031,390	115.83	102,914	61,250	41,023	—332,282
Kansas City Terminal Co	24	.....	.....	97,076	11,534	24,919	.....	56,300	1,037	95,350	98.22	1,726	19,900	—18,179	—19,625
Lake Erie & Western	902	606,761	57,046	693,043	97,580	206,250	11,336	321,406	23,358	658,782	95.05	34,260	25,000	9,252	16,725
Lehigh & Hudson River	96	176,285	3,808	187,362	19,435	36,065	1,971	84,350	5,865	147,686	78.82	39,676	4,500	35,176	45,405
Lehigh & New England	224	143,437	1,440	162,822	34,857	57,656	2,753	90,432	9,217	194,889	119.69	—32,067	8,610	—40,677	—31,021
Lehigh Valley	1,435	3,267,817	382,722	4,101,561	491,289	1,338,611	31,951	2,172,048	94,053	4,143,338	101.01	—41,777	146,725	—188,505	337,693
Long Island	398	358,130	881,470	1,402,621	257,011	269,492	10,661	845,931	45,230	1,442,131	10.281	—39,510	85,804	—125,448	83,639
Los Angeles & Salt Lake	1,168	905,781	324,606	1,305,160	226.871	292,509	13,764	432,575	28,491	1,025,279	78.55	279,880	67,245	212,428	79,031
Louisiana & Arkansas	302	144,366	40,043	189,630	46,194	35,536	5,158	84,049	7,528	178,465	94.11	11,165	11,955	—817	—37,685
Louisiana Ry. & Navigation Co	349	237,980	36,265	284,779	67,496	52,524	3,625	186,320	6,985	316,949	111.29	—32,170	14,000	—46,189	—80,513
Louisiana Western	207	159,114	103,886	270,614	31,556	57,874	4,743	83,874	11,242	191,427	70.73	79,187	9,069	70,117	—99,938
Louisville & Nashville	5,013	5,487,145	2,036,620	7,954,799	1,346,029	2,003,107	115,510	3,285,491	181,998	6,961,325	87.51	993,474	246,768	746,286	—675,756
Louisville, Henderson & St. Louis	199	160,330	55,758	219,768	51,625	27,884	7,480	89,152	7,864	184,004	83.72	35,764	4,000	31,598	—24,361
Maine Central	1,216	868,744	313,982	1,271,707	185,694	339,920	9,292	795,037	35,809	1,365,797	107.39	—94,089	75,623	—169,722	44,364
Maryland, Delaware & Virginia Ry Co	82	50,449	20,685	73,559	6,161	13,338	471	57,496	1,914	79,379	107.91	—5,820	1,733	—7,553	—14,749
Michigan Central	1,862	3,596,645	1,164,469	5,229,848	798,484	1,116,042	58,694	2,134,639	104,645	4,277,434	81.78	952,414	160,000	791,839	501,405
Midland Valley	387	230,449	68,231	309,510	55,679	49,088	2,329	114,878	12,374	234,348	75.72	75,162	6,713	68,166	9,846
Mineral Range	101	74,984	417	77,323	10,650	19,755	354	45,404	992	77,156	99.78	167	3,300	—3,133	3,594
Minneapolis & St. Louis	1,647	614,546	205,133	865,746	186,894	222,465	9,841	523,935	29,709	968,847	111.90	—103,101	53,806	—157,261	—171,707
Minn. & International Ry. Co	194	60,472	20,996	85,374	11,533	13,800	600	56,425	3,351	85,709	100.39	—335	4,178	—4,520	—10,413
Minn., St. Paul & Sault Ste. Marie	4,243	2,111,907	516,225	2,790,644	366,947	672,483	22,381	1,290,090	70,806	2,435,411	87.27	355,233	187,693	167,535	269,282
Mississippi Central	164	40,991	23,800	67,901	19.661	27,308	1,262	33,875	5,374	87,478	128.83	—19,577	3,325	—22,704	—48,358
Missouri & North Arkansas	315	58,482	30.033	94,764	70,907	42,224	2,347	56,332	7,840	179,380	189.29	—84,616	6,242	—90,932	—97,835
Missouri, Kansas & Texas	1,714	1,629,387	612,533	2,374,860	428,798	745,794	23,193	880,495	73,432	2,160,920	90.99	213,940	85,355	128,517	28,332
Missouri, Kansas & Texas of Texas	1,796	1,094,114	536,562	1,741,738	340,816	331,650	14,232	961,028	74,139	1,735,977	99.66	5,961	47,864	—43,228	21,716
Missouri, Okla. & Gulf	332	70.036	16,343	91,526	45,184	37,860	1,672	62,233	5,882	153,039	167.21	—61,513	8,507	—70,389	—54,046
Missouri Pacific	7,108	5,019,704	1,572,365	7,054,732	1,361,110	1,741,220	77,156	3,135,253	194,814	6,537,554	92.66	517,178	260,893	254,027	—880,533
Mobile & Ohio	997	893,062	178,797	1,138,118	215.416	399,964	25,503	531,422	39,289	1,213,073	106.59	—74,956	55,174	—130,158	—109,138
Monongahela	108	215,611	19,234	240.803	40.215	36,412	738	88,586	5,813	171,762	71.32	69,041	5,000	64,022	24,381
Monongahela Connecting	5	.....	.....	174,940	30,497	64,998	511	98,388	6,501	200,896	114.83	—25,956	2,256	—28,212	—10,270
Montour R. R.	54	52,677	1.598	61,432	20,339	58,096	1,241	22,823	6,160	108,876	177.23	—47,444	2,315	—47,758	—29,190
Morgan's La. & Texas R. R	400	346,897	160,084	530,965	75.145	127,786	9,356	259,757	18,943	402,950	75.89	38,016	31,033	6,472	—196,629
Nash., Chatt. & St. L	1,247	851,713	41,334	1.369,383	321,788	320,199	30,800	704,190	52,396	1,441,872	105.29	—72,490	50,000	—122,731	—379,632
Nevada Northern	168	111,914	11,709	127,786	17,009	22,972	899	37,633	3,991	82,607	64.64	45,179	18,323	26,856	—46,741
Northern Alabama	112	98.878	12,366	115,149	25,014	6,132	1,270	68,423	1,648	102,487	89.00	12,662	3,400	9,262	—10,335
Newburgh & South Shore R. R	7	.....	.....	127,714	15,614	25,562	.....	60,867	3,453	105,496	82.60	22.218	7,219	14,999	36,526
New Orleans & N. E	203	303,446	98,211	451,359	93,453	161,127	7,585	251,755	14,945	530,739	117.58	—79,380	28,357	—107,758	—179,159

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.					
New Orleans Great Northern	284	$122,754	$37,985	$167,335	$36,200	$37,475	$2,367	$70,079	$7,841	$154,341	92.23	$12,994	$12,905	$25	—$40,697
New Orleans, Texas & Mexico	191	98,476	27,682	146,277	25,184	34,615	1,264	55,859	5,071	124,026	84.78	22,250	10,000	12,216	—33,800
New York Central	6,075	13,447,557	5,173,518	20,513,580	2,913,812	4,751,071	229,511	9,772,742	590,315	18,592,657	90.63	1,920,923	1,004,920	914,633	401,210
New York, Chicago & St. L.	572	1,766,793	189,766	2,009,538	238,925	357,780	24,800	755,725	52,179	1,431,374	71.22	578,164	55,000	523,164	563,643
New York, New Haven & Hart.	1,965	3,082,651	2,951,698	6,954,768	997,404	1,695,020	34,958	3,843,654	265,317	6,994,162	100.56	—39,394	270,000	—309,904	—672,288
New York, Ont. & Western	567	417,714	77,825	615,507	93,479	224,167	7,870	336,510	21,372	683,399	111.03	—67,892	24,700	—92,556	—115,473
New York, Phila. & Norfolk	121	417,012	113,509	576,666	55,076	120,525	9,092	287,635	11,624	498,901	86.51	77,765	17,021	60,745	86,478
New York, Susq. & Western	135	185,764	48,983	271,377	23,650	52,714	2,062	188,158	7,369	273,953	100.94	—2,576	16,440	—19,048	3,452
Norfolk & Western	2,086	4,667,754	887,774	5,832,320	758,650	1,657,935	37,001	2,138,158	112,909	4,724,607	81.07	1,107,713	260,000	847,597	133,871
Norfolk Southern	907	305,633	117,047	459,287	101,948	121,975	6,754	238,239	19,125	488,406	106.34	—29,119	20,000	—49,132	—134,277
Northern Pacific	6,566	5,026,366	1,316,572	6,844,713	947,227	1,258,851	61,861	2,595,796	183,036	5,145,682	75.17	1,699,031	509,153	1,189,361	300,314
Northwestern Pacific	507	196,066	130,365	363,072	103,388	58,190	4,117	200,118	12,399	379,876	104.62	—16,804	22,069	—39,056	—94,162
Oregon Short Line	2,347	1,852,310	461,800	2,485,770	498,298	438,930	15,040	847,841	84,950	1,936,787	77.91	548,983	177,964	370,848	—71,289
Oregon-Wash. R. R. & Nav. Co.	2,069	1,279,606	441,561	1,879,162	393,359	319,249	23,798	791,013	95,184	1,652,732	87.95	226,429	114,531	111,632	97,732
Panhandle & Santa Fe	772	274,531	72,786	366,074	112,531	136,225	3,359	214,706	17,257	478,992	130.85	—112,918	16,213	—129,201	—233,443
Pennsylvania Co.	1,754	4,656,918	1,377,991	6,775,759	974,142	2,135,984	69,860	3,558,471	186,932	6,978,329	102.98	—202,571	288,551	—491,291	—605,375
Pennsylvania Railroad	5,360	16,602,487	6,778,894	26,048,657	3,392,082	7,062,100	245,503	12,877,857	751,945	24,804,292	95.22	1,244,365	856,619	386,426	3,643,707
Peoria & Pekin Union	19	35,584	1,967	91,768	14,916	18,418	347	64,581	3,651	101,914	111.05	—10,146	9,500	—19,646	—5,922
Pere Marquette	2,332	1,713,030	345,647	2,236,941	348,860	447,805	26,230	1,037,041	71,513	1,935,450	86.52	301,491	—6,372	307,739	359,717
Phila. & Reading	1,127	3,614,866	709,470	4,695,025	494,976	1,531,219	29,835	2,879,558	128,392	5,080,832	108.21	—385,808	143,228	—529,036	390,492
Phila., Bethlehem & New Eng.	71	.....	.....	67,766	5,366	9,434	209	39,970	1,343	56,321	83.11	11,445	1,633	9,812	—10,399
Pitts. & Lake Erie	224	1,947,216	183,722	2,375,042	476,077	636,180	12,993	789,332	40,099	1,956,149	82.36	418,892	75,500	343,392	145,726
Pitts. & Shawmut	103	66,501	4,704	71,281	28,074	34,605	969	31,416	2,585	97,650	136.99	—26,369	969	—27,337	—22,131
Pitts. & W. Va.	63	77,137	8,574	98,312	60,357	23,365	1,128	42,662	4,978	139,392	141.79	—41,079	10,876	—51,944	—31,005
Pitts., Cinc., Chicago & St. L.	2,387	4,280,250	1,539,766	6,642,521	825,405	2,052,033	73,818	3,329,575	177,110	6,521,853	98.18	120,668	232,228	—112,040	—185,006
Port Reading	21	120,565	.....	245,591	21,932	22,112	20	106,524	224	150,814	61.40	94,777	9,000	85,777	125,591
Richmond, Fred. & Pot.	77	354,290	247,615	628,502	46,157	73,132	5,009	212,543	12,877	359,121	57.13	269,381	13,126	256,252	161,046
Rutland	415	164,387	85,765	298,286	62,941	94,112	8,571	167,438	10,918	343,979	115.31	—45,693	19,059	—64,768	22,076
St. Joseph & Grand Island	258	170,827	34,058	216,861	64,493	26,870	1,600	131,583	10,999	237,091	109.32	—20,229	8,811	—29,040	—62,587
St. Louis, Brownsville & Mexico	548	230,290	114,040	368,627	59,144	58,402	2,789	124,161	14,087	258,583	70.14	110,044	10,000	99,915	—9,858
St. Louis, Merchants Bridge, Terminal	9	.....	783	206,377	52,564	43,873	830	174,799	6,120	279,186	135.27	—72,809	8,000	—80,809	—95,949
St. Louis-San Francisco	4,761	3,868,689	1,576,374	5,797,256	1,033,883	1,267,159	45,008	2,274,962	175,053	4,777,582	82.41	1,019,667	226,997	789,886	552,571
St. Louis, San Fran. & Texas	134	75,142	12,909	94,127	19,538	21,000	753	65,275	5,250	111,818	118.79	—17,691	1,962	—19,664	—45,908
St. Louis Southwestern of Texas	814	346,019	103,774	471,175	145,317	172,765	5,104	207,822	26,697	557,361	118.29	—86,186	21,000	—107,219	—1,906,676
St. Louis Southwestern	93	795,685	135,168	971,498	249,203	251,326	21,947	316,188	43,821	882,131	90.80	89,367	37,140	51,965	—308,048
St. Louis Transfer	6	.....	.....	94,708	9,606	17,265	210	46,266	2,057	75,405	79.61	19,303	100	19,203	6,330
San Ant. & Aransas Pass	732	261,534	74,319	355,924	94,272	99,456	5,838	172,689	18,984	390,867	109.81	—34,943	15,000	—50,006	—70,841
Seaboard Air Line	3,563	2,166,319	903,911	3,368,612	543,154	774,823	64,602	1,644,702	105,366	3,163,176	93.90	205,435	135,000	69,784	—338,238
South Buffalo Ry. Co.	11	38,499	.....	136,469	11,950	18,811	279	56,824	1,432	89,296	65.44	47,172	2,306	44,872	57,388
Southern R. R.	6,982	6,164,215	2,631,292	9,507,704	1,583,333	2,642,014	115,793	4,137,739	267,564	8,809,021	92.65	698,683	322,216	370,101	1,401,766
Southern in Mississippi	278	94,921	46,644	151,164	39,252	15,703	2,067	70,993	4,459	132,475	87.63	18,689	9,000	9,688	—4,473
Southern Pacific	7,049	7,427,350	2,833,277	11,068,001	2,213,902	2,355,227	99,038	4,562,417	293,329	9,730,556	87.91	1,337,444	613,996	720,841	—889,576
Spokane International Ry. Co.	156	46,882	12,307	60,705	8,979	7,287	1,720	24,912	4,306	47,062	77.53	13,643	4,012	9,631	—10,211
Spokane, Portland & Seattle	554	391,409	91,175	520,384	113,604	87,443	4,160	179,270	18,968	405,203	77.86	115,181	59,200	55,946	—128,865
Staten Island Rapid Transit Co.	23	60,914	59,339	144,300	19,692	19,873	984	79,288	8,538	128,375	88.96	15,925	12,000	3,912	47,466
Tennessee Central	293	117,337	40,666	173,269	81,151	75,561	6,009	87,665	6,175	256,561	148.07	—83,292	5,135	—88,427	—87,616
Terminal R. R. Ass'n of St. Louis	36	.....	3,230	283,871	79,489	53,907	835	138,947	7,121	284,029	100.06	—157	28,250	—28,407	—43,344
Texarkana & Ft. Smith	81	86,213	15,643	110,975	34,031	7,549	571	35,273	3,584	70,854	63.85	40,122	6,458	33,650	15,912
Texas & New Orleans	469	357,421	145,468	529,715	113,180	212,216	5,556	217,488	14,945	574,893	108.52	—45,178	21,086	—66,592	—220,947
Texas & Pacific	1,946	1,614,718	621,637	2,367,239	447,466	578,069	24,290	1,308,880	73,777	2,451,929	103.58	—84,690	87,401	—172,100	—537,382
Toledo & Ohio Central	435	447,112	54,156	526,076	107,166	206,765	6,450	240,591	16,176	579,238	110.11	—53,163	30,238	—83,432	7,358
Toledo, Peoria & Western	247	59,778	45,721	112,116	23,491	41,300	2,238	61,318	5,359	133,706	119.26	—21,590	8,500	—30,090	—25,670
Toledo, St. Louis & Western	454	468,325	23,082	511,955	87,800	138,717	6,874	212,660	10,142	456,192	89.11	55,763	26,000	29,659	—8,274
Trinity & Brazos Valley	368	76,876	16,450	98,142	39,903	47,486	1,535	52,757	7,934	149,614	152.44	—51,473	5,715	—57,249	—24,515
Ulster & Delaware	128	35,862	11,573	69,389	10,391	21,544	1,110	50,760	4,632	89,022	128.28	—19,633	4,600	—24,233	—11,112
Union Pacific	3,614	5,706,436	1,369,434	7,615,256	1,034,479	1,462,438	44,121	2,353,287	228,020	5,294,285	69.52	2,320,971	—44,789	2,365,351	1,169,674
Union R. R. of Penna.	35	.....	.....	532,634	60,748	152,617	264	282,746	7,143	503,308	94.49	29,327	6,428	22,899	231,003
Utah Ry.	98	97,712	485	99,134	10,283	25,965	363	18,877	1,860	57,346	57.84	41,789	4,089	37,700	—6,478
Quincy, Omaha & Kansas City	255	49,519	23,039	78,867	25,036	—3,307	363	40,506	1,160	63,568	80.60	15,299	3,003	12,290	21,125
Vicks., Shreve. & Pacific	171	174,955	68,478	264,171	51,550	58,830	2,829	103,494	8,585	226,854	85.87	37,316	9,417	27,899	—30,448
Virginian	518	476,127	48,602	593,609	143,160	276,919	4,014	326,960	15,130	764,948	128.86	—171,339	38,000	—209,339	—369,948
Wabash	2,519	2,464,853	612,106	3,321,093	419,844	745,706	54,773	1,885,276	106,526	3,230,197	97.23	90,896	113,886	—23,073	143,061
Washington Southern	35	144,825	168,446	332,145	28,888	42,611	3,220	110,058	7,424	196,313	59.10	135,831	6,381	129,448	82,407
West Jersey & Seashore	361	242,700	379,504	677,793	185,229	131,811	7,530	422,662	21,795	772,841	114.02	—95,048	40,063	—135,111	—6,363
Western Maryland	707	732,434	73,093	883,077	199,675	314,201	17,594	398,560	42,486	980,842	111.07	—97,764	43,200	—140,964	—13,885
Western Pacific	1,011	627,736	70,623	727,577	235,367	177,685	9,014	283,273	21,057	740,292	101.75	—12,716	48,777	—61,508	—209,979
Western Ry. of Alabama	133	118,524	69,492	199,348	23,915	43,503	2,734	82,352	6,533	162,143	81.34	37,205	7,500	29,704	—4,376
Wheeling & Lake Erie	511	499,404	45,750	608,263	160,120	196,846	6,582	337,468	23,295	726,477	119.43	—118,213	54,800	—173,013	—158,812
Wichita Falls & N. W.	328	111,296	33,135	150,947	61,060	24,949	1,875	57,383	6,043	161,310	106.86	—10,363	9,256	—19,619	3,534
Yazoo & Mississippi Valley	1,382	1,293,922	408,126	1,789,615	311,699	376,326	15,418	694,089	49,588	1,376,795	76.93	412,821	68,468	344,224	4,388

Traffic News

Harry F. Masman has been appointed manager of the Traffic Bureau of the city of Charleston, S. C.

Grain loading for the period from January 1 to March 22 amounted to 247,221 cars, as compared with 266,129 cars in the corresponding period of 1918

In Providence, R. I., sleeping car berths may now be ordered by telephone, on the understanding that payment shall be made at the ticket office within one hour from the time that the transaction by wire is completed. Berths sold in this way cannot be paid for on trains.

The Jackson (Mich.) Traffic Club has elected W. P. Hobart, agent of the American Railway Express Company, president; J. E. Manley, Mott Wheel Works, vice-president; H. A. Plummer, L. H. Field Company, secretary, and J. R. Gibbs, Michigan State Prison, treasurer.

Hearings will be held by the Public Utilities Commission of Illinois on four complaints made by Illinois dealers in sand and gravel against the rates to Chicago. The complaints are filed against the Chicago Switching Committee, the Chicago & North Western, the Chicago, Milwaukee & St. Paul and the Illinois Central.

The Railroad Administration has announced that because of the decision of the Grain Corporation to sell reserve stocks of wheat to local millers, the situation at interior elevators is now in such shape that the permit system on all grains, including wheat, will be temporarily suspended. Grain control committees will, however, be maintained so that further emergencies may be met promptly.

The directors of the Chamber of Commerce of Kansas City, Mo., have adopted resolutions urging the Railroad Administration to take immediate steps to restore railroads and other transportation facilities to private control. The resolution states that the service rendered by transportation facilities under federal control is not up to the standard existing under private control and has not improved, since the cessation of hostilities, to the extent expected.

A decision sustaining the right of the government, under the federal control act, to increase intrastate rates has been handed down by Judge Dickson of the district court of Ramsey county, Minn., in the case of the state of Minnesota against the American Railway Express Company. This decision was made on a motion of the plaintiff for a temporary injunction restraining the express company from charging the increased rates that have been in effect since January 1, 1919.

Production of both anthracite and bituminous coal stands at a total of about 50 per cent of full time output according to reports furnished by the Geological Survey and announced by the United States Fuel Administration. Production has been at a low ebb ever since the signing of the armistice on November 11, and the demand for coal has been gradually falling off, because of the mild winter. Consumers have been using from stocks accumulated last summer and fall, and are still holding back their orders.

At the New York City freight stations of the Pennsylvania Railroad and the Old Dominion Steamship Line a rule has been adopted that inbound freight shall be delivered only to the wagons of the consignee, other wagons being refused permission to enter the piers. It appears that consignees of perishable freight have disposed of goods to retailers before arrival, and the wagons of these retailers have been sent for the freight; and the carriers now say that heavy losses have been sustained by merchandise being wrongfully taken.

There has been a marked decrease in freight traffic in the Central Western region during the past month as compared with the same period last year. The traffic in grain, coal and livestock shows decreases of 27.3 per cent, 38.3 per cent and 18.3 per cent respectively. The roads in this region loaded 32,595 cars of grain during March this year as compared with 44,808 cars during the corresponding month last year; coal cars loaded, 70,791, as compared with 98,700 in 1918; carloads of livestock, 45,120, a decrease from 54,699 last year.

A hearing was held on April 2, before the Western Freight Traffic Committee on an appeal from the decision of the Chicago Eastern and Western District Traffic Committees that Central Freight Association class rates should apply on Illinois intrastate rates instead of the Illinois classification. This appeal has been made by Illinois shippers. R. B. Coapstick, traffic manager of the Indiana Chamber of Commerce, represented the Indiana interests, on whose complaint the decision of the district committees was made. R. W. Ropiequet, representing the Illinois District Traffic League, made the principal appeal for the Illinois shippers. Another hearing was held the following day before the district committees concerning the rates on commodities from and to Indiana points as compared with rates in Illinois. An effort was made by the Indiana Commission to withdraw from the case and let the Indiana Manufacturers' Association take its place as complainant, but inasmuch as the case had been formally heard with the Indiana Commission as complainant and as the case would die if this substitution were to be made, it was unsuccessful. The Indiana Chamber of Commerce includes in its membership individuals and associations interested primarily in this case.

Traffic Through the Sault Ste. Marie Canals

The total freight traffic passing through the American and Canadian canals at Sault Ste. Marie, Michigan and Ontario during the season of 1918 totaled 85,680,327 tons. This is a decrease of 5 per cent, or 4,133,571 tons, as compared with the traffic for the season of 1917. All the items of freight show a decrease, with the exception of oil. The total number of passengers was 34,990, or a decrease of 3,349. The American canal took 85 per cent of the freight, 84 per cent of the net registered tonnage and 23 per cent of the total number of passengers.

Export Traffic

The total number of carloads of export freight on hand at North Atlantic ports for the week ended April 1, was 36,023, compared with 36,250 for the week previous. With a total working capacity of 23,533,000 bushels, there were 20,315,000 bushels of grain in elevators at North Atlantic ports for the period mentioned. At South Atlantic and Gulf ports there were 11,651 carloads of export freight on hand, as against 11,420 cars on March 22.

Great Lakes Commerce Association

This association was organized at Milwaukee, Wis., at a recent conference of representatives of cities located on the Great Lakes. More than 60 delegates representing 18 cities in this district were present. The needs of the Great Lakes for transportation facilities were discussed and a resolution was adopted urging Congress to take steps to provide the facilities needed. A special committee was instructed to confer with the director general of railroads. The officers of the association are W. G. Bruce, Milwaukee, Wis., president; George A. Schroeder, Milwaukee, vice-president; F. E. Williamson, Buffalo, N. Y., vice-president; Frank Barry, Milwaukee, secretary and treasurer.

A Million for Advertising

The expenditure of $1,000,000 for advertising calculated to stimulate passenger travel has been authorized by the Railroad Administration. This money will be expended entirely in newspaper and magazine advertising and informative booklets, and will be devoted entirely to the exploitation of localities and not to the service of individual roads. As the advertising is to be national in character and its management must be closely coordinated, the work will be done under the supervision of the three territorial passenger traffic committees who have been instructed to prepare recommendations as to the localities.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has discontinued its investigation, started on February 5, 1912, into the use of passes and free passenger service.

Hearings were held before Examiner Attorney G. U. Brown, of the Interstate Commerce Commission, this week, at Washington, in the railway mail pay case, which has been pending since 1916. The commission is to render a decision as to the rates and as to the merits of the space or weight basis, or both, for compensating the railroads for carrying the mails.

New Classification for Freight Statistics

The Interstate Commerce Commission has called upon all railroads of class 1 and class 2 to report, beginning with January 1, 1919, in their annual reports, the weight of revenue freight transported divided into 59 classes, which will provide information in considerably greater detail than is now required. All commodities are to be stated in tons of 2,000 lb. each. Products of agriculture are divided into 20 classes; products of animals into 12 classes, products of mines into 10 classes, of forests into 2 classes and manufactures into 15 classes. Class 59, headed "Merchandise," is to include all less than carload freight. Under the head of manufactures empty packages are put in a class by themselves. Crude petroleum and salt will be reported under the head of products of mines.

Court News

North Dakota Acts Against Federal Freight Rates

The Supreme Court of North Dakota on April 2 issued a mandamus restraining the Northern Pacific and other roads from charging, within that state, the increased passenger and freight rates established last June by the director general. This action was taken on the application of the attorney general of the state, claiming that the act of Congress of March 21, 1918, did not confer on the president or the director general any authority to interfere with "'lawful police regulations of any state." It is understood that the Railroad Administration will appeal the North Dakota decision to the Supreme Court of the United States.

United States Supreme Court

Compensation for "Transportation of Troops" Within Land-Grant Acts

The Supreme Court of the United States has affirmed the judgment of the Court of Claims (52 Ct. Cl. 226) granting recovery of the 50 per cent deduction made from the Union Pacific's compensation under the land-grant statutes for the transportation of persons alleged to be "troops of the United States." The following classes of passengers were held not to be within the act: Discharged soldiers; discharged military prisoners; rejected applicants for enlistment in the army; accepted applicants for enlistment in the army (being forwarded for final examination and enlistment); retired soldiers and furloughed soldiers. The furloughed soldier is, of course, a part of the army or troops of the United States; but his transportation back to the proper station is held not "transportation of troops" within the meaning of the land-grant acts. The furloughed soldier travels for his own purposes. The government merely advances to him the cost of transportation and subsistence while on furlough, and does this only if the soldier lacks funds to bear the expense himself.—United States vs. Union Pacific. Decided March 31, 1919.

Equipment and Supplies

The Interstate Commerce Commission on Thursday issued a set of regulations prescribing the method of competitive bidding as provided in section 10 of the Clayton Law on all contracts with or purchases amounting to over $50,000 from companies or persons with which there is an interlocking relationship. The carriers and the director general are given until May 15 to file objections. The law has been suspended, but became effective January.

Steel Prices

At the request of Mr. Peek, a meeting was held between R. S. Lovett, Henry Walters and H. B. Spencer, representing the Railroad Administration, and a few of the members of the general committee of the American Iron and Steel Institute, in New York, on Wednesday of this week to discuss the subject of producing costs of certain lines of steel in which the railroads are especially interested. Nothing was given out as to the results of the discussion, but it was understood that the representatives of the Railroad Administration would report at once to Director General Hines.

Locomotive Deliveries Week Ended March 29

The following new locomotives were shipped to railroads under federal control during the week ended March 29:

Works	Road	Number	Type
American	C. M. & P.	21	USRA Mikado.
	P. L. W.	11	USRA Santa Fe
	Erie R. R.	6	USRA Santa Fe
	C. N'w'n.	4	USRA 6W. Sw.
	P. L. W.	2	Santa Fe.
	A. C. L.	2	USRA Pacific
	C. of G.	2	Mallet
	T. & P.	4	USRA 6W. Sw.
	C. & N'w.	1	Mikado.
		53	
Baldwin	C. B. & Q.	2	Mikado.
	P. & L. E.	4	USRA Mikado.
	C. C. & O.	1	Mikado.
	I. C.	1	Mikado.
	A. T. & S. F.	4	Mikado.
	L. V.	2	Pacific.
	G. N.	2	8W. Sw.
	U. P.	1	Pacific.
	O. W. R. & N. Co.	1	
		18	
Total		71	

Car Deliveries Week Ended March 29

New standard cars were accepted during the week ended March 29, as follows:

Road	Number	Type	Manufacturer	Total accepted for given roads
Sou. Pac.	55	50 Ton S. S. Box	Am. Car & Fdy. Co.	55
C. C. & O.	66	50 Ton S. S. Box	Bettendorf Co.	228
Sou. Pac.	140	50 Ton S. S. Box	Haskell & Barker	189
N. & W.	330	50 Ton S. S. Box	Pullman Car Co.	730
N. Y. C.	57	70 Ton L. S. Gon.	Pressed St. Car Co.	500
P. McK. & Y.	23	70 Ton L. S. Gon.	Pressed St. Car Co.	23
Total	671			

Cars Constructed in Railroad Shops in February

The Railroad Administration has issued the following statement of new cars constructed in railroad shops during the month of February:

Class of cars	Steel	Steel underframe	Steel center sills	Wood	Total
Freight:					
Stock	..	6	92	9	107
Hopper	..	..	..	56	56
Gondola	..	..	..	24	24
Flat	..	24	..	25	49
Coke rack	..	..	..	4	4
Work car	..	2	..	6	8
Miscellaneous freight cars	..	..	..	3	3
Caboose	12	67	2	2	83
Box	146	16	62	24	248
Refrigerator	..	..	..	..	..
Total freight equipment	158	115	156	153	582

Large Purchases of Ties

The West Coast Lumbermen's Association announces at Seattle, that Oregon and Washington mills have sold to the United States Railroad Administration 175 million feet of Douglas fir ties to be sent by water to the Atlantic Coast; also that 40 million feet of ties have been ordered by French and English railroads. These figures mean about 4⅓ million ties for American railroads, and one million for Europe.

chanical interlocking machine for an extension to an existing 52-lever machine at South Norfolk, Va. The extension will have 17 mechanical levers and 7 electrical units.

Delivery of Standard Cars to March 31

The Railroad Administration has compiled the following statement showing the delivery of U. S. R. A. standard cars as of March 31:

Type	Manufacturer	A. C. L.	B. & L. E.	B. R. & P.	C. C. & O.	C. & W. C.	C. & N'w.	C. B. & Q.	C. C. C. & St. L.	C. & S.	Georgia	I. C.	K. & M.
40 Ton D. S. Box	Am. Car & Fdy. Co.	450	...	...	...	...	1,250	500	...	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.	300	...	...	...	...	...	...	750	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.	200	...	...	...	300	...	...	...	...	...	...	...
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	250	...	...	...	...
Total		...	...	...	...	...	...	...	...	...	...	...	...
50 Ton S. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	500	...	...	...	...	...	...
50 Ton S. S. Box	Haskell & Barker	...	...	...	...	...	500	...	...	...	300	...	...
50 Ton S. S. Box	Pullman Car Co.	...	...	...	...	...	...	...	...	...	...	...	...
50 Ton S. S. Box	Bettendorf Car Co.	...	...	...	238	...	...	...	...	...	...	...	...
Total		...	...	...	...	...	...	...	...	...	...	...	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	...	...	...	...	...	500	250	...	...	...	...	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	150	...
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	50	...	...	...	...	...	...	...	...	...	...	...
50 Ton Comp. Gon.	Haskell & Barker	250	...	...	...	...	500	...	...	...	...	50	...
50 Ton Comp. Gon.	Pressed St. Car Co.	...	...	...	...	...	...	500	...	...	100	500	...
50 Ton Comp. Gon.	Std. Steel Car Co.	...	...	...	...	...	...	250	...	...	...	300	...
Total		...	...	...	...	...	...	...	...	...	...	...	...
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	250	...	250	...	...	...	200	...	...	...	...
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	150	...
55 Ton St. Hop.	Pressed St. Car Co.	...	...	500	250	...	...	...	200	...	...	200	300
55 Ton St. Hop.	Pullman Car Co.	...	...	300	...	...	...	...	200	300	...	250	...
55 Ton St. Hop.	Ralston St. Car Co.	...	...	...	...	...	...	...	200	...	...	200	200
55 Ton St. Hop.	Std. Steel Car Co.	...	250	...	250	...	...	...	200	...	...	200	...
Total		...	...	...	...	...	...	...	...	...	...	...	...
70 Ton St. Hop.	Pressed St. Car Co.	...	...	...	...	...	...	...	...	...	...	...	...
Total		...	...	...	...	...	...	...	...	...	...	...	...
Grand total		1,250	500	800	988	300	3,250	1,500	2,000	300	400	2,000	500

Type	Manufacturer	L. & N.	M. C.	M. P.	N. C. & St. L.	N. Y. C.	N. Y. N. H. & H.	N. & W.	P. M. & Y.	S. P.	T. & O. C.	Total
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	16	...	500	...	...	...	...	...	2,716
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	500	...	...	...	...	250	1,800
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	500
40 Ton D. S. Box	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	250
Total		...	...	...	...	...	...	...	...	...	...	5,266
50 Ton S. S. Box	Am. Car & Fdy. Co.	...	500	...	...	...	...	...	500	100	...	1,600
50 Ton S. S. Box	Haskell & Barker	...	...	...	...	1,000	...	...	...	204	...	2,004
50 Ton S. S. Box	Pullman Car Co.	...	500	...	...	...	...	780	...	...	...	1,280
50 Ton S. S. Box	Bettendorf Car Co.	...	...	...	...	...	...	...	...	...	...	238
Total		...	...	...	...	...	...	...	...	...	...	5,122
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	250	200	...	250	...	...	...	...	...	...	1,650
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	...	...	...	250	...	...	...	...	...	...	400
50 Ton Comp. Gon.	Am. Car & Fdy. Co.	150	200	...	...	...	...	...	...	...	...	400
50 Ton Comp. Gon.	Haskell & Barker	...	200	...	...	...	...	...	...	...	...	1,000
50 Ton Comp. Gon.	Pressed St. Car Co.	400	200	...	500	...	...	...	...	...	...	2,200
50 Ton Comp. Gon.	Std. Steel Car Co.	200	200	...	...	...	...	...	...	...	...	950
Total		...	...	...	...	...	...	...	...	...	...	6,600
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	500	1,200
55 Ton St. Hop.	Am. Car & Fdy. Co.	...	...	...	...	...	...	...	...	...	...	150
55 Ton St. Hop.	Pressed St. Car Co.	400	...	...	...	500	400	...	...	...	...	2,750
55 Ton St. Hop.	Pullman Car Co.	200	...	...	...	...	500	...	...	...	...	1,750
55 Ton St. Hop.	Ralston St. Car Co.	...	...	...	...	...	200	...	...	...	...	800
55 Ton St. Hop.	Std. Steel Car Co.	400	...	...	...	500	400	...	...	...	...	2,200
Total		...	...	...	...	...	...	...	...	...	...	8,850
70 Ton St. Hop.	Pressed St. Car Co.	...	...	...	...	500	...	...	42	...	...	542
Total		...	...	...	...	...	...	...	...	...	...	542
Grand total		2,000	2,000	16	200	4,500	1,500	780	542	304	750	26,380

Signaling

THE CHESAPEAKE & OHIO has placed an order with the Federal Signal Company of Albany, N. Y., for an electro mechanical interlocking machine and other materials for installation at Kenova, W. Va. This machine will have 22 working machanical levers and 18 electric levers.

THE NEW YORK CENTRAL has ordered from the Federal Signal Company of Albany, N. Y., a 68-lever frame style "A" mechanical interlocking machine with 51 working levers for Jordan, N. Y.

THE VIRGINIAN RAILWAY has placed an order with the Federal Signal Company of Albany, N. Y., for a 24-lever style "A" me-

HEAVY CONSTRUCTION.—James O. Heyworth, engineer and general contractor, Chicago, has issued a 64-page album of photographs and short descriptions of various large construction projects carried on by his firm. Among these are included several railway construction contracts.

PIPE THREADING MACHINERY.—An illustrated catalogue of pipe threading and cutting machines and pipe and nipple threading machines has been issued by the Landis Machine Company, Inc., Waynesboro, Pa. The catalogue contains a detailed discussion of all the machines, but aims principally to set forth the distinctive features of the Landis die and chaser as compared with other types. This is known as catalogue No. 25 and copies may be had upon request.

Supply Trade News

The Standard Railway Equipment Company of New York, Chicago and St. Louis has moved its New York offices from the Singer building to the Equitable Trust building.

S. V. Sargent has been appointed district manager of sales of the **Chicago Pneumatic Tool Company,** Chicago, with headquarters at Boston, Mass., to succeed **F. S. Eggleston,** who has resigned.

The Pacific Car & Foundry Company, Seattle, Wash., has expended approximately $400,000 in new buildings, tools and equipment in refitting their car building plants situated at Reuton, Wash., and Portland, Ore.

The name of the **Aspromet Company** or **Asbestos Protected Metal Company** of Pittsburgh, Pa., manufacturer of roofing, siding, ventilators and skylights, was changed to the **H. H. Robertson Company,** effective April 1.

The Interstate Iron & Steel Company at Chicago has opened a branch office at Detroit, Mich., with **R. B. Dutch** in charge of sales in that territory. Mr. Dutch has been identified with the iron and steel industry for several years.

C. M. Schramm, chief clerk to the general mechanical superintendent of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been appointed assistant to the vice-president of the Vapor Car Heating Company at Chicago.

The entire executive staff of the **Okonite Company** was transferred on April 1 from 501 Fifth avenue, New York, to the company's plant at Passaic, N. J., where the main office will hereafter be located. A sales office will be retained at 501 Fifth avenue, New York.

William K. Stamets, Pittsburgh, Pa., announces the opening of an office in Cleveland, Ohio, under the management of Wm. S. Dickson, formerly general manager of the Greaves Klusman Tool Co., Cincinnati, Ohio. The Stamets organization will represent exclusively the majority of machine tool manufacturers that it now represents in Pittsburgh.

Ensign Donald Walker, U. S. Naval Aviation Corps, died in the Naval Hospital at Key West, Florida, on Monday, April 7, as the result of a fall of an aeroplane, of which he was the pilot, at Miami, Florida, on April 1. He was the son of Edmund H. Walker, vice-president of the Standard Coupler Company and president of the Railway Supply Manufacturers' Association. Ensign Walker was a student at Yale University when he entered the aviation service last year. He was 21 years of age.

The Wetmore Reamer Company is the new name of the Wetmore Mechanical Laboratory Company, of Milwaukee. This company has completed all of its contracts with various munition makers of Canada and this country to whom it supplied Wetmore expanding reamers, hobs, taps, lathe and boring bar tools. Since the completion of this work it has resumed its former tool business, specializing in a type of expanding reamer for all grades of industrial reaming operations. More floor space has been added and the offices enlarged. P. H. Door, recently released from the government service, has joined the organization as secretary and sales manager.

E. I. du Pont de Nemours & Co., Inc., announces the organization of **E. I. du Pont de Nemours Export Company,** a subsidiary corporation, created for the purpose of handling foreign business, effective April 1, 1919. The officers of the new company are as follows: F. W. Pickard, president; W. S. Gavan, vice-president and director of sales; F. D. Brown, treasurer; Alexis I. du Pont, secretary. The same staff which has previously been associated with the du Pont export business will be continued with some additions made necessary by the broader scope of the new corporation. The main offices will be located at 120 Broadway, New York, with branches in San Francisco, Mexico City, London and Rio de Janeiro.

H. H. Simmons, who has been connected with the Simmons-Boardman publications for the last 10 years, has severed his connection with that company to become associated with John H. Cross in the advertising service business under the firm name of Cross & Simmons, Inc., with offices in the Webster building, Chicago. Mr. Simmons was born at St. Joseph, Ill., on November 14, 1888. He attended the University of Illinois, graduating in civil engineering in 1909, and immediately joining the staff of the Simmons-Boardman Publishing Company. He was first employed as associate editor on news for the *Railway Age Gazette* in the Chicago office, later becoming assistant engineering editor. In May, 1915, he was appointed editor of the Railway Signal Engineer, and continued in active charge of the editorial work of that publication until November, 1917, when he was transferred to the business department of the Simmons-Boardman Publishing Company in the capacity of business manager of the Railway Maintenance Engineer, which position he held until his recent resignation.

D. P. Lamoreux, general manager of the Pratt & Letchworth Company, Ltd., Brantford, Ont., has been elected vice-president of the Canadian Car & Foundry Company, Ltd. Mr. Lamoreux has been connected with the Pratt & Letchworth Company since October, 1916. He was born in Mayville, Wis., December 12, 1873. He received his education at the University of Wisconsin, where he took a course in civil engineering as a member in the class of 1895. After leaving college he spent two years in the maintenance department of the Milwaukee Northern Railway, and the California Oregon Railway, and for the following three years was private secretary to the commissioner of the general land office at Washington, D. C. In 1900 he became associated with the Beaver Dam Malleable Iron Company and worked his way up through that organization until in 1913, when he left to take up another position, he was the company's general manager. During this period, also, he was on the executive and legislative committees of the Wisconsin Manufacturers' Association and for three years of this time, was also regent of the University of Wisconsin. In 1913 he entered the railway supply business in Chicago, and was connected with the Cleveland Steel Company and the Trumbull Steel Company. He became connected with the Pratt & Letchworth company in November, 1916, as general manager.

D. P. Lamoreux

Lieutenant Commander H. J. Elson, U. S. Naval Reserve Force, has been released to inactive status and has resumed his civilian work as secretary and treasurer of the Walter A. Zelnicker Supply Company, St. Louis, with which company he was in charge of internal management and manufacturing operations. Lieutenant Commander Elson was graduated from the U. S. Naval Academy in 1898, and after service in Cuba, the Philippines and China, resigned from the navy in 1902 to become interested in the Zelnicker company. He was chief engineer of the Missouri Naval Militia, with which organization he was mobilized into federal service upon the declaration of war, April 6, 1917. His assignment was as Inspector of Machinery, 9th, 10th and 11th Naval Districts, with headquarters at Chicago, where he had charge of the design and conversion to salt water use of the machinery of great lakes vessels taken over by the Navy, among which were the City of South Haven, Virginia and Puritan, as well as the rehabilitation and design and

installation of new machinery in the ill-fated Eastland, now named U. S. S. Wilmette and called by her crew "The Queen Gun-Boat Cruiser of the Navy."

J. S. Hobson, western manager of the Union Switch and Signal Company at Swissvale, Pa., with office at Chicago, has been elected president of the Massey Concrete Products Corporation of Chicago at the annual meeting of the board of directors, succeeding C. F. Massey, who has been elected chairman of the board. Mr. Hobson began his railway career as an engineer apprentice on the Great Southern & Western at Dublin, Ireland, in which capacity he was employed from 1884 to 1889. He came to this country in 1889 and entered the employ of the Chicago, Burlington & Quincy as locomotive machinist and draftsman. In 1892 he became associated with the Union Switch & Signal Company as a construction foreman in Chicago and St. Louis, and in 1896 he was appointed a signal supervisor on the Michigan Central, with headquarters at Detroit, Mich. The following year he entered the employment of the Atchison, Topeka & Santa Fe as signal engineer, with headquarters at Topeka, Kan., which position he held until 1901, when he returned to the service of the Union Switch & Signal Company as assistant engineer at Swissvale, Pa. In 1904 he was appointed assistant general manager, in which capacity he served eight years until he was promoted to western manager at Chicago. In 1914 he was made general sales manager, and in 1915 general manager, which position he held until 1916, when he was again appointed western manager at Chicago, in which capacity he will continue to serve the Union Switch and Signal Company, combining the duties of that office with those of president of the Massey Concrete Products Corporation.

J. S. Hobson

Federal Liquidating Association, Inc.

The Federal Liquidating Association has been formed to facilitate and hasten the liquidation of reduced, suspended, terminated or canceled war contracts, whether formal or informal.

Brig.-General Hugh S. Johnson will be president of the new association. General Johnson was largely responsible for the organization and administration of the draft and was also largely responsible for the reorganization of the Army supply system, and for the creation of the present system of purchase, storage and traffic. As author of the Army supply system, chairman of the War Department superior board of contract review and director of purchase, General Johnson naturally acquired great familiarity with the department's contracts.

Lieut.-Colonel R. H. Montgomery, of the accounting firm of Lybrand, Ross Bros. & Montgomery, who was a member of the War Department board of appraisal and of the War Industries Board price fixing committee, will have charge of the accounting for the association.

The officers of the Association for Manufacturers of War Material, whose efforts resulted in the passage of the war contracts validation bill, will share in the direction of the association. These are W. S. Symington, president of the Symington Chicago Corporation; C. J. Symington, president of the Symington Machine Corporation, and H. H. Dinneen.

The Washington headquarters of the association, Munsey building, Washington, D. C., will keep in close touch with the various governmental departments, presenting the contractors' point of view and attending to the expedition and presentation of all matters pending.

Local offices have been established at each of the following points selected because of their convenience to local boards of adjustment: New York, Boston, Philadelphia, Baltimore, Rochester, Pittsburgh, Cleveland, Detroit, Bridgeport, Cincinnati, Chicago and St. Louis. Each local office has a business manager, an accounting and engineering department, a local counsel and a competent office personnel.

The plan of having accounting engineering and legal departments is not intended to restrict the use by contractors of their own experts in these lines.

Trade Publications

DUFF JACKS.—The Duff Manufacturing Company, Pittsburgh, Pa., has issued a new 16-page catalogue listing the various types of bridge, track and car jacks and other equipment manufactured by that company. The jacks are catalogued in regular order with a small illustration, short description and table of capacities and limiting dimensions of each type.

FROGS AND CROSSINGS.—The Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a 12-page leaflet of information on its products, with special reference to solid cast manganese frogs for turnouts and crossings and solid manganese crossings, including the Eymon continuous crossing and the Balkwill articulated cast manganese crossing.

RECLAIMING RAILROAD FROGS.—The Air Reduction Sales Corporation, New York, has issued a 24-page booklet illustrating and describing the process of reclaiming railroad frogs by the oxy-acetylene process. The process is described in detail, with diagrams and photographs. Considerable cost data and material and service records are also given.

OVERHEAD CARRYING SYSTEMS.—Catalogue 50, issued by the Coburn Trolley Track Manufacturing Company, Holyoke, Mass., manufacturers of overhead carrying systems for both "round trough" and I-beam, shows price lists, illustrations, plans and dimension drawings of overhead carriers and their details. The catalogue contains 56 pages, 8½ in. by 11 in. and illustrates a number of actual installations.

PUMPING MACHINERY.—The National Transit Company, Oil City, Pa., manufacturers of special machinery to meet the requirements of pipe line companies, has begun the manufacture of other machinery for general service, including pumping machinery, gas and oil engines, which together with old lines are illustrated and described in various bulletins. These have been bound in heavy manila covers in such a way that others may be added from time to time as they are issued.

TWIST DRILLS, REAMERS, ETC.—A machinists' supply catalogue, No. 91, listing carbon and high speed twist drills and reamers, screw and drop forged wrenches, spring cotters and keys, etc., has been issued by the Whitman & Barnes Manufacturing Company, Akron, Ohio. The catalogue contains 183 pages and a distinctive feature of it is a thumb index marked to show the products listed in the various sections, making it an easy matter to find desired information.

SAW MILL MACHINERY.—The American Saw Mill Machinery Company, New York, has issued an attractive 48-page booklet under the title "How Americans Helped to Win the War," which contains an illustrated account of the part that saws and woodworking machinery played in the war, both in the construction of camps, ships, hospitals, etc., on this side and abroad and in connection with American lumbering operations in the French forests. A large number of photographs show the uses of this equipment under a wide variety of conditions, while in the latter part of the book appear reproductions of letters of commendation by contractors and others who used the equipment.

REPAIR OF THE GERMAN SHIPS.—A booklet of 24 pages, telling of the remarkable work of repairing and reclaiming by Plastic-Arc welding 288,780 gross tons of interned German ships which had been damaged apparently beyond repair by their German crews, is being distributed by the Wilson Welder & Metals Company, New York, manufacturers of the Plastic-Arc welding apparatus. Included in the booklet is the report of this work by the Secretary of the Navy, a description of the Wilson system of welding, and an article reprinted from Iron Age, entitled The Part of Electric Welding in Repairing the Damaged Ships, by Captain E. P. Jessop, U. S. N., who recommended that the broken cylinders be repaired by welding. The text is well illustrated.

Financial and Construction

Railway Financial News

BALTIMORE & OHIO.—See Staten Island Rapid Transit Company.

CHICAGO & NORTH WESTERN.—At the annual stockholders' meeting, John V. Farwell, Edward M. Hyzer and Homer A. Miller declined re-election, and were succeeded by Childs Frick, James A. Stillman and Samuel A. Lynde. The other directors whose terms had expired, Chauncey M. Depew, Henry C. Frick and David P. Kimball, were re-elected. The stockholders ratified the directors' acceptance of the government contract.

NEW YORK CENTRAL.—R. S. Lovett and Carl R. Gray have been elected directors to succeed C. B. Seger, resigned, and W. H. Newman, deceased.

NEW YORK, ONTARIO & WESTERN.—The payment of dividends on the common stock has been deferred until compensation for 1918 is received from the Railroad Administration.

NORFOLK & WESTERN.—See editorial comment elsewhere in this issue.

SOUTH CAROLINA & GEORGIA.—J. P. Morgan & Co. have announced that arrangements have been made by the Southern Railway, with the consent of the director general of railroads, to offer to holders of $2,250,000 South Carolina & & Georgia first mortgage 5 per cent bonds, falling due May 1, the right to extend their holdings for ten years with interest at the rate of 5½ per cent. Holders of the maturing issue may at the same time receive a cash payment of 2¼ per cent, so that the extended bonds will net them 5.80 per cent. Holders who do not extend will be given par and interest for their bonds at maturity.

SOUTHERN PACIFIC.—Samuel Rea, president of the Pennsylvania Railroad, has been elected a director to succeed W. B. Scott, a federal manager in the Southwestern Region, and Paul Shoup, vice-president of the Southern Pacific, has been elected to succeed William Sproule, district director of the Central Western Region.

SOUTHERN RAILWAY.—See South Carolina & Georgia.

STATEN ISLAND RAPID TRANSIT COMPANY.—The New York Public Service Commission has adopted an order permitting this company to issue at not less than par and interest $1,150,000, 4 per cent refunding bonds, due June 1, 1948, interest payable semi-annually. The bonds are redeemable at par and accrued interest on and after June 1, 1925. The issue is secured under the company's $5,000,000 refunding mortgage, executed June 1, 1905, to the Guaranty Trust Company of New York, as trustee. The proceeds are to be applied for the discharge or refunding of an equal amount of the company's obligations to the Baltimore & Ohio Railroad, for the acquisition and improvement of its property. The application stated that the Staten Island Rapid Transit Company was indebted to the Baltimore & Ohio to the amount of $1,625,000.

Railway Construction

LEHIGH VALLEY.—This road has awarded a contract to the Roberts & Schaefer Company, Chicago, for the construction of a 750-ton capacity, four track, automatic electric, reinforced concrete locomotive coaling plant and a 750-ton storage reinforced concrete sand handling plant at Ashmore, Pa. The contract price is $75,000 and installation will begin immediately.

TEMISKAMING & NORTHERN ONTARIO.—Separate bids are wanted for each section, April 15, by W. H. Maund, secretary-treasurer, Toronto, Ont., for the construction of the roadbed, except steel bridges, on the section between Swastika and Kirkland lake, 6 miles, and between Timmins and the Mattagami river, 2 miles. Separate bids for each section are also wanted for track laying, ballasting and fencing.

Railway Officers

Railroad Administration

Central

Swagar Sherley, who has been appointed director of the Division of Finance of the United States Railroad Administration, as was announced in our issue of March 14, page 596, was born on November 28, 1871, at Louisville, Ky., and graduated from the University of Virginia in 1891. He is a lawyer by profession, having begun practice in 1891, at Louisville. He has been a member of Congress since 1903, and for a number of years has been a member of the House Appropriations Committee. Mr. Sherley was chairman of that committee in the Sixty-Fifth Congress, and, effective about April 15, will enter upon his duties as director of the Division of Finance, to succeed **John Skelton Williams,** resigned.

Swagar Sherley

Regional

Harry M. Adams, whose appointment as traffic assistant to the regional director of the Southwestern region, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 28 (page 860), was born at Camanche, Iowa, on January 3, 1867. He entered railway service in 1880 with the St. Louis-San Francisco as messenger at Cherryvale, Kan. He later held various positions on the Kansas City, Fort Scott & Gulf and the Southern Kansas and the Oregon Railway & Navigation Company. From 1889 to 1890 he was consecutively division baggage agent and advertising agent of the Union Pacific at Portland, Ore. After 3 years in other business and a year in South America he entered the traffic department of the O. R. & N. in 1894. On May 15, 1902, he was promoted to assistant general freight agent, with headquarters at Portland, Ore., and on June 18, 1905, left the Oregon Railway & Navigation Company to become assistant traffic manager of the Great Northern, with headquarters at Seattle, Wash. From December 1, 1907, to June 30, 1910, he was general freight and passenger agent of the Spokane, Portland & Seattle, at Portland, and from the latter date until March, 1914, freight traffic manager of the Western Pacific. On August 1, 1913, he was appointed also freight and traffic manager of the Denver & Rio Grande. In March, 1914, he was also appointed general traffic manager of the Missouri Pacific and the St.

H. M. Adams

Louis, Iron Mountain and Southern, and in May, 1914, he resigned as freight traffic manager of the Denver & Rio Grande. In May, 1917, he was elected vice-president in charge of traffic of the Missouri Pacific system, with headquarters at St. Louis, Mo. In January, 1918, Mr. Adams was appointed director of inland transportation of the war department, with offices in Washington, D. C., in which capacity he served until his recent appointment.

Federal and General Managers

George B. Perkins, who has been appointed assistant federal auditor of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., was born in Cincinnati, Ohio, on August 5, 1865, and received his education in the Woodward High School of that city. He entered railway service in the maintenance department of the Pittsburgh, Cincinnati, Chicago & St. Louis in 1890, remaining with that road until 1892 and then entering the employment of the Cincinnati, New Orleans & Texas Pacific in the engineering department. The following seven years he was engaged in the commercial field in Cincinnati, Ohio, and Kansas City, Mo. He reentered railway service in July, 1901, as a clerk in the accounting department of the Kansas City, Fort Scott & Memphis which position he held until the consolidation of that road with the St. Louis & San Francisco in September, 1901, when he was transferred to St. Louis, Mo. From that time to June, 1911, he was consecutively clerk, statistician and general bookkeeper for the St. Louis-San Francisco, resigning in the latter year to engage in agricultural work at Portland, Ore. One year later he entered the service of the Spokane, Portland & Seattle and in January, 1914, he was employed by the Interstate Commerce Commission as examiner of accounts, in which capacity he served until April, 1918, when he resigned to enter the employ of the St. Louis-San Francisco as special accountant. On August 1, 1918, Mr. Perkins was appointed assistant auditor, in which position he served until his recent appointment as above noted.

J. A Somerville, whose resignation as general superintendent of transportation of the Missouri Pacific, the Memphis, Dallas & Gulf, the Arkansas Central and the Natchez & Southern was announced in the *Railway Age* of April 4 (page 923), has been appointed general manager of the Texas & Pacific, the Trans-Mississippi Terminal, the Weatherford, Mineral Wells & Northwestern, the Gulf, Texas & Western, the Denison & Pacific Suburban and the Fort Worth Belt, with headquarters at Dallas, Tex. He was born at Carthage, Ill., on November 25, 1867, and received his education in the public schools of that place. He entered railway ervice on November 17, 1887, and was employed up to 1897 in the local office and yard of the Chicago, Burlington & Quincy at Keokuk, Ia. From that time to 1899 he served as general agent at Hannibal, Mo., and the following year as local agent at St. Louis, Mo. From 1900 to 1902 he was contracting freight agent at St. Joseph, Mo., and the next year became chief clerk to the general freight agent at St. Louis. In 1903 he was promoted to general agent, with headquarters at Keokuk, which position he held until 1905, when he became superintendent of terminals of the same road, with headquarters at St. Louis. The next five years he held the position of superintendent of the terminal division of the Missouri Pacific, with office at Kansas City, Mo., after which time he was appointed superintendent of transportation of that road and the St. Louis, Iron Mountain & Southern, with headquarters at St. Louis.

J. A. Somerville

Upon the resignation of E. F. Kearney in May, 1913, as general superintendent of transportation of the Missouri Pacific, the Memphis, Dallas & Gulf, the Arkansas Central, the Natchez & Southern and the Natchez & Louisiana, Mr. Somerville was promoted to that office. When the office of superintendent of transportation was abolished on January 15, 1917, he was promoted to general superintendent of transportation, with the same headquarters and in June, 1917, he was temporarily assigned to the commission on car service of the American Railway Association at Washington, D. C., in which capacity he served until January, 1919, when he resigned to return to his former position as general superintendent of transportation at St. Louis, in which position he remained until his recent appointment as general manager of the Texas & Pacific.

The jurisdiction of **G. L. Peck,** federal manager of the Pennsylvania Railroad, Western Lines, and associated lines, with headquarters at Pittsburgh, Pa., has been extended over the Wheeling Terminal Railroad, which line is released from the jurisdiction of **C. W. Galloway,** federal manager.

Operating

George Masten has been appointed superintendent of the Norfolk & Portsmouth Belt Line Railroad, with office at Portsmouth, Va., vice **W. A. Gore,** transferred.

L. R. Taylor has been appointed superintendent of the New River division of the Virginian Railroad, with headquarters at Princeton, W. Va., vice **H. W. Sheridan,** deceased.

J. B. McMann, superintendent of the Bangor & Aroostook, with office at Houlton, Me., has been transferred to the Southern division, with office at Bangor; **J. P. Darling,** trainmaster, has been appointed superintendent of the Northern division, with office at Houlton, Me. **F. A. Andrews,** superintendent at Bangor, has been appointed trainmaster of the Southern division, with office at Millinocket, and **Joel H. Curtis,** trainmaster of the Southern division, has been transferred to the Northern division, with office at Houlton, Me.

W. C. Ennis, division superintendent of the Chicago, Milwaukee & St. Paul, with office at Miles City, Mont., has been appointed assistant superintendent of the Coast division of the Tacoma Eastern Railroad, and that part of the Columbia division west of Othello, with headquarters at Seattle, Wash. **W. S. Johnson,** trainmaster on the Coast division, has been appointed trainmaster of the Columbia division, vice **T. E. McFarlane,** who has been appointed assistant trainmaster and traveling engineer of the Idaho division, vice **H. R. Calehan,** assigned to other duties. The position of trainmaster on the Coast division has been abolished.

Financial, Legal and Accounting

L. S. Smith, acting federal treasurer of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt.

E. K. Scott has been appointed federal auditor of the Kentucky & Indiana Terminal Railroad, with office at Louisville, Ky., vice **C. R. Arnold,** resigned.

The jurisdiction of the following Texas & Pacific officers has been extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch): **George Thompson,** general solicitor; **A. J. Biard,** federal auditor, and **W. L. Holder,** land and tax commissioner; all with headquarters at Dallas, Texas.

Traffic

E. A. deFuniak, general freight agent of the Louisville & Nashville, with office at Montgomery, Ala., has been appointed general freight agent, with office at Louisville, Ky., vice **D. M. Goodwyn,** promoted, and **J. A. Ridgely** has been appointed general freight agent, with office at Montgomery, Ala., vice Mr. deFuniak.

J. R. Wilson, traffic manager of the Sacramento Northern, with headquarters at Sacramento, Cal., has resigned, effective April 30. Mr. Wilson entered the employ of the Northern Electric Railway as traffic manager in 1914, which, after its reorganization, adopted the name of the Sacramento North-

ern. Prior to his service with the Sacramento Northern he was employed in the general freight office of the Southern Pacific at San Francisco, Cal., and later acted in the capacity of commercial agent for the Illinois Central at San Francisco.

J. B. Payne, traffic manager of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

The titles of **W. G. Story,** assistant general freight agent, and **M. J. Powers,** assistant general passenger agent of the Delaware & Hudson and associated lines, with headquarters at Albany, N. Y., have been changed to general freight agent and general passenger agent, respectively.

Engineering and Rolling Stock

E. F. Mitchell, chief engineer of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

Purchasing

R. L. Irwin, purchasing agent of the Texas & Pacific, with office at Dallas, Texas, has had his jurisdiction extended over the Fort Worth Belt and the International & Great Northern (Spring to Fort Worth and Madisonville branch).

Corporate

Executive, Financial, Legal and Accounting

William W. Tirrell has been appointed general auditor of the Maine Central Railroad Company (Corporate), with office at Portland, Maine.

Arthur B. Hoff, formerly industrial commissioner of the Erie, with headquarters at New York, and later in the United States naval service, has returned to railway work as assistant to president of the Erie Railroad Corporation.

Walter H. Ardley, controller of the Grand Trunk, with headquarters at Montreal, Que., retired from active service on April 1, under the superannuation plans of the company. He was born on April 24, 1858, in London, Eng., and was educated in the City of London College. In 1883 he entered the service of the Grand Trunk in the general auditor's office, and was in the continuous service of that road for 36 years. In November, 1893, he became chief clerk and general bookkeeper. He was appointed auditor of disbursements in 1907, and in 1908 served as acting general auditor, until December 31 of that year. He was then appointed general auditor of the Grand Trunk and the Grand Trunk Pacific, and since August, 1914, served as controller of the same roads, with headquarters at Montreal, Que.

W. H. Ardley

Alexander R. Lawton, general counsel of the Ocean Steamship Company of Savannah, has been elected president, with office at Savannah, Ga., in place of **William H. Pleasants,** deceased.

Reginald H. M. Temple, general solicitor of the Canadian National Railways at Toronto, Ont., has been transferred to Winnipeg, Man., and is now in charge of the legal department; **W. W. Evans** and **T. H. Gilmour,** solicitors at Winnipeg, have resigned, and the position of **O. H. Clarke,** western counsel, has been abolished.

Traffic

Bernard R. Marsales, division freight agent of the Canadian National, with headquarters at Calgary, Alberta, has been transferred to Saskatoon, Sask.

F. G. Frieser, export freight agent of the Canadian Pacific, has been appointed general agent of the freight department of the Canadian Pacific Ocean Services, Limited, with office at New York City.

M. S. Throne, district freight agent of the Canadian Pacific, with office at Cleveland, Ohio, has been appointed general agent of the freight department, with office at New York, to succeed **R. E. Larmour,** promoted, and **G. S. Hiam** has been appointed district freight agent, with office at Cleveland, to succeed Mr. Throne.

Engineering and Rolling Stock

W. F. Connal has been appointed mechanical engineer of the Canadian National Railways, with office at Toronto, Ont., vice **H. D. Cameron,** resigned to enter other service.

Obituary

Amos H. Watts, who was master mechanic of the Cincinnati Northern, with office at Van Wert, Ohio, previous to July, 1912, died on March 30, at his home in Walnut Hill, Ohio, at the age of 72.

Charles E. Henderson, formerly second vice-president of the Philadelphia & Reading, with office at Philadelphia, Pa., died on April 10, at his home near Easton, Md. He was born on September 25, 1844, in Jefferson county, West Virginia, and began railway work on January 5, 1870, as a clerk at the Fort Scott station of the Missouri River, Fort Scott & Gulf, now part of the St. Louis-San Francisco. He subsequently held various positions on a number of roads in the Middle West until December, 1889, when he was appointed general manager of the Philadelphia Reading Coal & Iron Company, and from October, 1903, to May, 1908, was first vice-president of the same company. From November, 1896, to May, 1908, he served also as second vice-president of the Philadelphia & Reading Railway, in charge of freight traffic.

Curtis Dougherty, chief engineer maintenance of way and structures of the Southern System, lines west, with headquarters at Cincinnati, Ohio, died at his home in that city on March 30. He was born at Otterville, Ill., on July 30, 1863, and received his education at Washington University, St. Louis, Mo., graduating in 1885. He began his railway career in 1887 in the office of the chief engineer of the Wisconsin Central and the following year he was appointed engineer of the Chicago & Western Indiana, in which capacity he served until March 1, 1892, when he entered the employ of the Illinois Central as assistant engineer. From June 1, 1893, to June 1, 1902, he was roadmaster of the Chicago division and upon the latter date was appointed superintendent of the Springfield division of the same road. On January 15, 1907, he resigned his position with the Illinois Central to become assistant chief engineer of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, which position he held until the consolidation of these lines with the Southern system, when he was appointed chief engineer maintenance of way and structures.

C. Dougherty